BARK BEETLE CONDITIONS

NORTHERN REGION

2005

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Northern Region
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December 2005

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REGIONAL SUMMARY

In both 2004 and 2005, western Montana and northern Idaho received normal or slightly higher amounts of precipitation. Most of the Region, with the exception of southeastern Montana, showed improved growing conditions for most bark beetle hosts over the past couple of years. Still, long-term drought affects are not easily overcome. Many bark beetle species remained at extremely high levels and showed only slight response to improved host conditions in 2005. As a result of at least somewhat-improved conditions, infested areas recorded for some bark beetle species—notable exceptions being mountain pine beetle and Douglas-fir beetle—declined in 2005. Fortunately, mostly-optimal weather conditions permitted aerial survey of nearly all beetle-infested areas, for the first time since 2002. Approximately 90% of the forested portions of the 24 reporting areas were flown. For most of the Region, ground-collected data showed decreasing bark beetle populations for most species, except mountain pine beetle.

Mountain pine beetle-infested areas increased in many locations surveyed; however, in some locations, intensity of beetle-caused mortality is declining due to host depletion. Decreases, at least in intensity, were noted in infested areas recorded on Lolo, Nez Perce, and Deerlodge National Forests (NF), despite little reduction in total acres affected. In total, considerably more infested acres were recorded in 2005 than in 2004. Much of that total infested area was recorded in whitebark pine stands, where outbreak extent and intensity increased significantly. For the first time in a couple of years, we have a relatively accurate measure of total infested area, throughout the Region.

Douglas-fir beetle-infested acres decreased in northern Idaho but increased in much of western Montana. At a few locations in southwestern and central Montana, populations remained at outbreak levels. Overall, infested acres increased in 2005; however, that was a reflection of trees killed in 2004. Ground surveys indicated beetle activity subsided in most areas. Grand fir mortality attributable to fir engraver decreased from all-time high levels recorded in 2004; but western balsam bark beetle-killed subalpine fir was mapped on more acres than last year. Looking forward to 2005, we are hopeful of continuing the recovery from droughty conditions of the past several years. With continued near-normal weather, we are cautiously optimistic we may see bark beetle populations begin to decrease in intensity, and even extent. Should we have a departure from normal amounts of moisture received this fall, and an unusually dry spring, we could see a resurgence of bark beetle activity in the coming year.

Mountain Pine Beetle (MPB):

The infested area mapped in 2005 increased significantly in many parts of the Region. With the exception of Kaniksu NF, most areas in northern Idaho reported increases. In

western Montana, most areas also showed an increase in infested areas. Lolo NF reporting area showed an exceptional increase; however, some of the most heavily infested areas were not flown in 2004, so direct comparisons to 2005 figures were not meaningful. On Deerlodge and Flathead NFs, where most affected areas were flown both years, infested area increased once again. Acres on which beetle-caused mortality was recorded, in all species and on all ownerships, increased considerably, to more than 1,057,000 acres—the highest total since 1986. Slightly more than 675,000 acres had been recorded in 2004. On those infested acres, more than 3.6 million trees were killed in 2004—recorded as faders in 2005. A little more than 80% of those were lodgepole pine. Although beginning to decline in some host stands, beetle populations continued to expand in many areas. As many as 90 new attacks per acre (in lodgepole pine) were found in one area surveyed.

A significant increase in beetle-caused mortality was noted in whitebark pine stands—especially on Gallatin, Helena, and Beaverhead NFs and in Yellowstone National Park (NP). Ground observations in some areas confirmed that many of those infestations are still expanding.

Many susceptible lodgepole, whitebark, and ponderosa pine stands remain in the Region. Unless weather patterns change to ones more favorable to their host and less conducive to beetle survival and population expansion, or management activities reduce availability of susceptible hosts, MPB populations and resultant tree mortality will continue until few susceptible hosts remain in many stands.

Douglas-fir Beetle (DFB):

Despite a few local decreases, DFB populations remained at nearly static levels in most parts of northern Idaho. A notable decrease was noted on the Kaniksu NF, while most others showed very slight increases, or levels similar to those recorded in 2004. Nez Perce NF had the biggest increase, while infested acres mapped on Coeur d'Alene and Clearwater NFs were at nearly static levels. Overall, infested area in North Idaho increased slightly, from 8,900 acres in 2004 to just over 9,000 acres in 2005. Few currently infested trees were observed in areas surveyed in northern Idaho.

In western Montana, most infested stands in the northwestern part of the State showed static or declining populations; however, a marked increase was noted on the Flathead NF. In many areas, beetle-killed trees were still obvious; but seldom did we find higher numbers of new attacks in 2005. A notable exception was found in northwestern Glacier NP, where two heavily infested stands were found. Stands surveyed in and around areas affected by 2000 fires, on parts of Bitterroot and Helena NFs, showed populations beginning to decline. Few areas had more new attacks in 2005 than in 2004. Infested area recorded on aerial detection surveys declined on the Helena NF, from 18,800 acres in 2004 to slightly less than 5,560 acres in 2005. On the Bitterroot NF, where beetles have infested stands not affected by fire, infested area increased from 31,000 acres in 2004 to almost 70,000 acres in 2005—still the most heavily impacted reporting area in the Region. Ground surveys and observations showed fewer areas with high amounts of

currently infested trees, so we believe the infestation has begun to decline. Surveys conducted on Deerlodge and Lolo NFs showed significant increases in infested areas. On the Gallatin NF, populations remained high in some stands, and overall, more acres were recorded in 2004 than in 2005. Later-than-normal attacks found on the Gallatin NF in October 2004 resulted in little tree mortality. Spring surveys indicated few of those late-season attacks were successful.

Region-wide, the infested area mapped increased to more than 177,500 acres; up from 101,400 acres in 2004. In some stands, particularly on Bitterroot, Lolo, Deerlodge, and Gallatin NFs, populations may be still increasing. In some areas, increases may be more perceived than real. It is often difficult to separate year of kill from the air.

In some areas of western Montana, small-diameter Douglas-fir have been killed during the past 2-3 years, with damage attributed to DFB. Ground observations have shown that many of those, in 6- to 10-inch diameter classes, have in fact been killed by Douglas-fir pole beetles (*Pseudohylesinus nebulosus* [LeConte]), the flatheaded fir borer (*Melanophila drummondi* [Kirby]), or combinations of both. Both beetles respond to drought-stressed trees. In addition, many smaller-diameter western larch have also been recently killed by flatheaded fir borers. We expect those occurrences to decline with improving moisture conditions.

More than 2 million acres of Douglas-fir, older than 100 years, exist in the Region. Weather and stand disturbances—fire, defoliation, or wind throw—increase the likelihood of DFB outbreaks in susceptible stands. Preventive management is the key to reducing outbreak potential.

Western Balsam Bark Beetle (WBBB):

The number of acres on which subalpine fir mortality, attributed to WBBB, were recorded once again increased in 2005; but that could be a reflection of more areas surveyed in 2005 than an actual increase in beetle activity. Several Forests, where beetle populations have recently been high, were not flown in 2004. In the areas surveyed, in 2004, more than 175,300 infested acres were reported. That figure increased to 250,400 acres in 2005. An estimated 420,000 subalpine fir were killed. The Beaverhead NF, in southwestern Montana, harbored the most widespread outbreaks where nearly 82,000 infested acres were reported. In many areas, populations may still be increasing, but should soon respond to improved weather conditions.

Fir Engraver (FE):

Grand fir stands, in which FE-caused mortality was recorded, increased to an all-time high in 2004. Improved weather over the past two years has resulted in significant decreases in infested area in 2005. Most mixed-species stands in which grand fir was a component, in northern Idaho and western Montana, showed lower levels of infestation this year. Total infested area exceeded 298,650 acres in 2004, but was reduced to 95,900 acres in 2005. Nearly 146,000 grand fir were estimated to have been killed in 2004

(recorded as faders in 2005). We believe these dramatic decreases in FE-caused mortality were a result of better precipitation in both the past two years. Should we continue on this nearly-normal trend, populations should continue their decline in 2006.

Others:

Pine engraver beetle (IPS) populations, and associated tree mortality decreased substantially in ponderosa pine stands in the Region, but most of those decreases resulted from none being mapped on the Flathead Indian Reservation (IR) in western Montana. More than 14,000 acres had been recorded in 2004. Elsewhere in the Region, populations were static or increased somewhat. Notable increases were recorded on Custer and Bitterroot NFs and Northern Cheyenne IR in Montana. In total, about 13,000 infested acres were recorded; compared to just over 17,000 acres in 2004.

Spruce beetle (ESB) populations remained at endemic levels throughout Idaho and Montana. On the Kaniksu NF in northern Idaho, almost 500 acres were reported; but in no reporting area were more than 100 infested acres recorded. The outbreak recorded east of Yellowstone Lake in Yellowstone NP, mapped at more than 8,700 acres in 2003 now covers less that 2,000 acres. That outbreak has declined significantly.

Western pine beetle (WPB)-caused mortality, still relatively low for stand conditions, declined once again in 2005, to about 3,600 acres. Just over 10,300 acres had been reported in 2004. Almost half of those acres were reported on the Pintler RD of the Deerlodge NF, but mortality was very lightly scattered throughout. Most of the remainder was mapped in northern Idaho. An estimated 3,500 PP were killed. We anticipate continuing declines if precipitation patterns approach normal conditions.

Table 1. **Acres of Host Type Infested by Bark Beetles[1], 2003-2005 (x 1,000)**

	North Idaho[2]			Montana[2]			Region-Wide		
Host/Beetle	**2003**	**2004**	**2005**	**2003**	**2004**	**2005**	**2003**	**2004**	**2005**
DF/DFB[3]	12.2	8.9	8.9	76.5	92.5	168.4	88.7	101.4	177.5
ES/ESB	0.6	0.2	0.5	9.5	0.2	1.9	10.1	0.4	2.4
GF/FE	143.7	264.3	57.4	20.6	34.4	38.5	164.3	298.7	95.9
PP&LPP/IPS	1.2	1.0	0.1	5.0	16.1	12.7	6.2	17.1	12.8
PINE[4]/MPB	190.1	221.9	236.7	306.1	453.3	820.4	496.2	675.3	1,057.1
SAF/WBBB	66.7	41.6	41.8	76.0	133.8	208.5	142.7	175.4	250.4
PP/WPB	12.0	9.9	1.9	0.8	0.4	1.7	12.8	10.3	3.6

[1] Estimates are from annual aerial detection surveys. Bark beetles were assumed to have been the primary mortality-causing agent. Approximately 90% of the forested areas in the Region were surveyed in 2005.

[2] Figures for ID include that part of the IPNF in Washington; figures for MT

include Yellowstone NP and South Dakota.

[3] See note below for beetle and host abbreviations used throughout report.

[4] All MPB hosts: LPP, PP, WWP, WBP/LP (In 2005, infested acres by host were: 869,733; 38,431; 4,916; 144,068; respectively.)

The following abbreviations, for bark beetles and their hosts, are used throughout this report:

Beetles:

DFB: Douglas-fir beetle, *Dendroctonus pseudotsugae* Hopkins
MPB: Mountain pine beetle, *D. ponderosae* Hopkins
ESB: Spruce beetle, *D. rufipennis* (Kirby)
WPB: Western pine beetle, *D. brevicomis* LeConte
RTB: Red turpentine beetle, *D. valens* LeConte
IPS: Pine engraver, *Ips pini* (Say)
FE: Fir engraver, *Scolytus ventralis* LeConte
WBBB: Western balsam bark beetle, *Dryocoetes confusus* Swaine

Hosts:

LPP: Lodgepole pine
PP: Ponderosa pine
WBP: Whitebark pine
WWP: Western white pine
LP: Limber pine
DF: Douglas-fir
GF: Grand fir
SAF: Subalpine fir
ES: Engelmann spruce

Reporting Area (RA) summaries follow. For each, bark beetle effects on their respective hosts are noted. To the extent possible, we have indicated areas affected, an estimate of impacts, and beetle population trends. Though reporting areas are typically designated by names of National Forests, Indian Reservations, or National Parks; there may be within those reporting areas, lands of various ownerships—federal, state and private.

BARK BEETLE CONDITIONS IN MONTANA

Beaverhead Reporting Area

Dillon RD:

Large amounts of MPB-killed WBP and LPP in were recorded in the southern portion of Snowcrest Range. A few groups of WBBB-killed SAF and widely scattered DF, killed by DFB, were noted in that same general area. Lesser amounts of each were more generally scattered in the Blacktail Mountains south of Dillon.

To the south, in the Tendoy Mountains, widely scattered groups of WBBB and MPB-killed LPP were observed. South and west of Dillon, from Lemhi Pass to Bannock Pass, scattered groups SAF, were infested by WBBB. In a more general pattern, from Jeff Davis Peak, south to Morrison Lake, scattered WBBB-killed SAF and minor amounts of DFB-killed DF were noted. There were, in that same area, a few small groups of MPB-infested LPP and WBP recorded.

District-wide, 4,000 DFB-killed DF were recorded on about 1,800 acres; MPB-killed 6,100 LPP on almost 3,400 acres and 1,200 WBP on nearly 600 acres; and almost 10,000 SAF were killed by WBBB on 4,700 acres.

Wise River RD:

Small and lightly scattered groups of MPB-killed LPP were recorded in East Pioneer Mountains. Most were located south of Big Hole River. North of Big Hole River, from about Patton Spring to Fleecer Ridge, large groups of DFB-killed DF were also noted. In that same area, DF stands have also been heavily infested by western spruce budworm, *Choristoneura occidentalis*, Freeman (WSBW). Defoliation coupled with abnormally dry weather could result in increased DFB activity.

For the areas surveyed, DFB-caused mortality was observed on almost 6,600 acres, where 7,100 DF were killed; 7,000 SAF were killed by WBBB on nearly 4,700 acres; and 5,300 LPP were killed on 3,900 acres by MPB. Lesser amounts of mortality were recorded on adjacent State and private lands.

Wisdom RD:

There was much widely scattered beetle activity recorded throughout the Pioneer Mountains. Small groups of DFB-killed DF were concentrated in the north, with largest groups northwest of Wise River, and south towards Table Mountain. Significant amounts of WBBB-caused mortality and MPB-infested LPP were scattered throughout the District.

In the Beaverhead Mountains, west of Wisdom, many widely scattered, but generally smaller groups of SAF killed by WBBB and LPP infested by MPB were noted. DFB activity was also occasionally observed there, but that was down from the past several years. In the Anaconda Range to the north, larger groups of WBBB-killed SAF and MPB-killed LPP were mapped. Some of the larger groups of the former were near Mud Lake; the latter in the LaMarche Creek drainage.

Notable concentrations of WBBB activity, within the past few years mapped in the Ruby Creek drainage, west of Wisdom; and in the Beaver Creek and Thompson Creek drainages in the Anaconda Range to the north seems to have declined somewhat.

Area-wide, almost 13,000 DF were killed by DFB on 5,750 acres; 4,700 LPP by MPB on 2,900 acres; and WBBB killed just over 8,000 SAF on 4,800 acres.

Madison RD:

Widely dispersed small groups, intermixed with a few larger ones, of WBBB-infested SAF were noted in the Madison Range. In that same area, small and very lightly scattered groups of MPB-killed LPP and WBP were also observed. Small amounts DFB-killed DF were mapped in a few DF stands.

Throughout the Tobacco Root Mountains, large numbers of SAF, killed by WBBB, were found. Some groups were quite large—up to 5 trees per acre, covering several hundred acres each. Considerable amounts of MPB-killed LPP were observed in the northwestern part of the Tobacco Roots, from Meadow Creek north to Carmichael Creek. Noticeable increases in WSBW activity could result in increases of DFB populations. Those populations are now fairly low.

In the Gravelly Range to the south, still large amounts of WBBB-killed SAF were observed; but generally at lower levels than in previous years. Highest concentrations were noted in and around Morgan Gulch. Also throughout the Range, MPB activity in LPP stands increased significantly. Especially noticeable were groups of beetle-killed LPP near Baldy Mountain and south towards Wade and Cliff Lakes. Significant amounts of MPB-killed WBP, often in conjunction with white pine blister rust (BR), were recorded in the Gravellies as well. Some of those groups covered several thousand acres each.

In the Snowcrest Mountains southwest of Ennis, many large groups of WBBB-killed SAF, and MPB-infested LPP and WBP were mapped. WBP was also being affected by BR. In addition, significant amounts of MPB-killed WBP were noted in the Ruby Mountains, east of Dillon.

In the past couple of years, SAF mortality attributed to WBBB had reached extremely high levels throughout the District. Some stands were more heavily impacted than others, but it appeared there were few SAF stands on the District not affected to some extent. Relatively small groups—up to 100 trees each—were reported in the Tobacco

Root Mountains to the north. To the south, throughout the Gravelly Range, extremely large groups of faders—covering as much several thousand acres each, and averaging an estimated 3-5 trees per acre—were mapped within the past couple of years. That activity remained relatively static.

In 2004, largest concentrations of WBBB-killed trees were mapped south and west of Ennis in the Ruby Range, throughout the Snowcrest Range, and southern end of the Gravelly Range. Total affected area on the District was estimated at 9,700 acres on which an estimated 10,700 trees were killed. In 2005, those aerial survey estimates totaled more than 75,000 SAF killed on 30,200 acres. More than 58,000 WBP and another 20,300 LPP were killed by MPB on 30,200 acres and 13,000 acres, respectively. DFB killed about one tree per acre on 4,700 acres.

To the south, in the Centennial Range, on lands administered mostly by BLM, large amounts of SAF, killed by WBBB, were still present, but decreased from 2004 levels. In that same general area, significant amounts of LPP killed by MPB were recorded, with lesser amounts of WBP having been infested by MPB. Larger groups of SAF faders were noted west of Nemesis Mountain, then west of Baldy Mountain. WBBB killed about 13,800 trees on 8,900 acres. Most MPB-caused mortality was also west of Nemesis Mountain and totaled 27,000 LPP on 14,200 acres; and 30,200 WBP on 4,800 acres. Small amounts of DFB activity were observed at a few lower-elevation sites.

Total aerial survey estimates for the Beaverhead RA, on lands of all ownerships, showed nearly 23,500 acres infested by DFB; 92,900 acres infested by MPB (all hosts); and almost 82,000 acres infested by WBBB. Approximately 424,000 trees were killed by bark beetles throughout the area in 2004, recorded as faders in 2005. In addition, nearly 61,000 acres showed some level of WSBW defoliation. Dependent upon weather over the next few years, many of those trees could be killed by DFB.

Bitterroot Reporting Area

Stevensville RD:

Large areas of widely scattered LPP killed by MPB were mapped in the Sapphire Mountains northeast of Stevensville, between Threemile Point and Cleveland Mountain. From there, southward towards Owen Point, in the Sapphire Range, smaller and more thinly dispersed groups of MPB-killed LPP were found. In that same general area, minor amounts DFB-infested DF were noted. From Owen Point, south to Skalkaho Creek observers recorded larger groups of MPB-killed LPP, WBBB-infested SAF, and DF impacted by DFB. Significant groups of MPB-killed WBP were also noted in that vicinity. In the Bitterroot Range to the west, only very light and widely distributed bark beetle activity was found.

District totals, up from those mapped in 2004 showed about 1,800 acres of DFB-infested DF; and a marked increased of MPB-caused mortality—14,000 LPP on approximately 7,000 acres; another 3,000 WBP on 3,700 acres. More than 6,300 acres were affected by WBBB, on which 11,100 SAF were killed.

Darby RD:

South of Skalkaho Creek, still-large groups DFB-killed DF were mapped. Most were east of Black Bear Point. West of there, smaller groups DFB-infested trees were observed; however more-significant groups of MPB-killed LPP and lesser amounts PP were also noted. Small amounts of WBBB activity and a few PP killed by IPS were reported. To the west, north of Lake Como, a few large groups MPB-infested LPP, DFB- and WBBB-killed trees were located. South of Lake Como, several large groups DFB-infested DF were mapped closer to the Bitterroot River.

District-wide, DFB-infested acres increased significantly in 2005, to more than 12,700 acres, on which 28,000 DF had been killed. MPB activity also increased: 4,500 LPP were killed on 3,200 acres; and 5,700 WBP on 3,400 acres. Almost 10,200 SAF were killed on 6,800 acres. Minor amounts of other bark beetle-related mortality were occasionally observed.

Sula RD:

Many very large groups of DFB-killed DF were recorded at various locations on the District. While ground observations suggest beetle populations are declining, there were actually more and larger groups recorded this year than in 2004. Largest groups were mapped throughout East Fork Bitterroot River drainage, from Montana Prince Mine to Ross Hole. Some of those groups covered a few thousand acres and averaged 3-5 trees per acre.

On the western side of the District, from Saddle Mountain, north to West Fork Bitterroot River, numerous large groups of DFB-killed faders were reported. In that part of the District, a few smaller groups of MPB-killed LPP and WBBB-killed SAF were also noted.

Total area infested by DFB increased to slightly more than 26,000 acres. Just over 12,000 acres had been recorded in 2004. Approximately 60,000 DF were killed on those infested acres.

Also on the District several groups of LPP, killed by MPB and totaling 700 acres, were recorded. At higher elevations, SAF stands generally contained a few larger groups of WBBB-killed trees; totaling about 8,100 trees on 5,400 acres.

West Fork RD:

In 2005, we still recorded many large groups of DFB-affected DF throughout the non-wilderness part of District. Largest groups were noted from Hughes Creek north to Beavertail Creek. Other large groups were well-scattered throughout Nez Perce Fork Bitterroot River drainage. Lesser amounts of WBBB-killed SAF and MPB-killed trees, in both LPP and PP stands, were found at various sites throughout the reporting area. In southwest part of District, near the Idaho/Montana border, several larger groups of SAF, killed by WBBB, were seen.

District-wide, DFB infested more than 28,000 acres and killed more than 49,000 DF. MPB accounted for 2,300 dead LPP on 1,300 acres; and WBBB killed approximately 11,000 SAF on 7,500 acres.

Following the fires of 2000, a significant increase in beetle-infested stands not affected by fire, has been observed throughout the southern portion of the Bitterroot NF. Ground surveys conducted in the past several years showed many fire-damaged trees were infested in 2001, but many more non-damaged trees were attacked in 2002 and 2003. Surveys conducted in fire-affected and adjacent stands in 2004, showed generally declining numbers of new attacks, although numerous new attacks per acre were observed in some areas. That trend continued in 2005. In some areas, host depletion suggests beetle populations were beginning to decline.

Bitterroot RA totals for 2005 showed 69,300 acres infested by DFB, on which nearly 143,000 DF were killed. Only 31,000 acres had been infested in 2004. Slightly more than 12,700 acres LPP; 7,200 acres WBP; and about 500 acres PP contained varying amounts of MPB-caused mortality. About 33,000 MPB hosts were killed. Just over 26,000 acres of SAF stands were infested by WBBB, on which 40,400 SAF were killed. Morality attributed to other bark beetles was less significant.

Custer Reporting Area

Beartooth RD:

In the Pryor Mountains a few large groups DFB-killed DF were mapped, especially near Mystery Cave and along Commissary Ridge. Small amounts MPB-killed LP, plus significant amounts SAF, infested by WBBB, were lightly scattered throughout the area surveyed. West of Red Lodge, and north of Cooke City, several large groups of WBBB-killed SAF were mapped in upper reaches of Castle Creek, Picket Pin Creek, and Iron Creek.

Significant amounts of MPB-caused mortality in LP stands were mapped generally west of Red Pryor Mountain. Infested stands were also noted on lands administered by BLM in that area.

More than 2,100 acres DF; 3,400 acres SAF; 1,100 acres WBP, and 730 acres LPP contained measurable amounts of bark beetle-caused mortality, District-wide. Nearly 12,000 trees were killed.

Sioux RD:

Minor amounts of MPB- and IPS-killed trees were very widely distributed in PP stands in the North and South Cave Hills, east of Camp Crook; and in the Slim Buttes, east of Buffalo, SD. Southeast of Camp Crook, minor amounts of mostly IPS-killed PP were found in the Short Pine Hills. More widely scattered, but still mostly small groups of IPS-killed PP were mapped throughout Chalk Buttes, Ekalaka Hills, and Long Pines.

MPB killed an approximate 70 PP and IPS another 1,100 trees on a combined 1,300 acres, District-wide.

Ashland RD:

Very sparsely scattered, small groups of IPS- and MPB-killed PP were noted east of Ashland. IPS-caused damage was the more commonly encountered, but MPB-killed trees were widely observed as well. No significantly large groups were reported, but some of the larger ones were found north and west of Sayler.

Throughout the District, beetles killed about 12,000 PP on a combined 5,300 acres. Only 2,600 infested acres were reported in 2004.

Custer RA-wide, reported bark beetle-caused mortality totaled 3,900 DF killed by DFB on 4,300 acres. MPB was attributed with killing 500 LP on 320 acres; 400 PP on 600 acres, 760 LPP on 740 acres; and 1,340 WBP on 1,100 acres. And an estimated 8,300 WBBB-killed SAF on were reported on 4,300 acres. Most of those were increases over 2004 levels.

Deerlodge Reporting Area

Butte RD:

MPB-caused mortality in LPP stands increased in both extent and intensity in 2005, throughout the District. Populations are decreasing in some stands, such as those located in Thompson Park and Basin Creek; but are expanding markedly in others, as in those found in American Gulch and near Fleecer Mountain. Beetle-killed groups, extending for several thousand acres each and varying in intensity from 3 to 15 trees per acre were generally recorded in most LPP stands in every direction, centered on Butte. Most intensely affected stands were mapped near Delmoe Lake, China Gulch, Hanson Gulch and Browns Gulch. Small amounts of DFB-killed DF were also noted, but were nearly inconsequential when compared to MPB activity. With warmer and drier conditions,

however, DFB populations could increase in response to increasing amounts of WSBW-caused defoliation.

Ground surveys conducted there showed the infestation in that area is still quite active although decreasing in some areas due to host depletion. In the Lime Kiln area, new attacks, for one 10-plot area, averaged 42 per acre in 2004. That had increased to 72 per acre in 2005. Total for the area was 121 trees per acre killed over the past three years. In Basin Creek, ten plots revealed very few new attacks averaged 16 per acre, but a total of 130 tree per acre during the past 3-4 years. In the American Gulch area, where outbreaks are fairly recent, an average 72 trees per acre have been killed in the past 2 years.

District-wide, an estimated 264,000 LPP were killed on approximately 69,800 acres in the last year. Those estimates represent increases in infested area, but less intensive outbreaks from 2004 when more than 800,000 LPP were killed on about 55,000 acres. Some outbreaks became less intensive as a result of host depletion.

DFB-killed DF was noted in slightly increasing amounts throughout the DF type on the District. District-wide, DFB-caused mortality totaled 1,100 trees on 450 acres.

Jefferson RD:

MPB-killed LPP increased once again in most stands on the District. Especially noticeable were large beetle-killed groups between Whitetail Reservoir and Boulder. MPB populations also appeared to be building in the Bull Mountains, south of Boulder; and near Sourdough Mountain east of Boulder. In northern Tobacco Root Mountains, MPB-infested LPP stands were more numerous as well in 2005.

Infestations on the District were not quite as extensive as those on Butte RD, but increased significantly in 2005. Infested area on the District recorded as 75,000 acres in 2005. An estimated 216,000 LPP were killed. WBBB killed about 1,900 SAF on 950 acres.

North of Boulder, on lands administered by both BLM and FS, MPB had killed numerous groups of PP and a few groups of LPP. Beetle populations there did not increase significantly.

Deer Lodge RD:

MPB activity in LPP stands increased east of Deerlodge, especially near Sugarloaf Mountain, Black Mountain, and Orofino Mountain. West of Deerlodge, significant MPB-caused mortality in LPP stands was noted from Cup Lake, south nearly to Anaconda. Minor amounts of DFB-killed DF were noted in that general area as well.

MPB outbreaks on the District totaled about 12,400 acres in 2005. Approximately 22,000 LPP were killed. Only 3,600 acres had been recorded in 2004. DFB- and WBBB-caused mortality was much less significant—found on about 550 and 250 acres, respectively.

Pintler RD:

MPB-killed LPP once again increased in 2005—although not drastically—from Anaconda to Georgetown Lake, and into the upper reaches of Rock Creek. More notable than MPB, however, were large amounts of DFB-killed DF still found throughout the western portion of the District. That activity, thought to be declining, was especially prevalent in the upper Rock Creek drainage and its tributaries. Large groups of DFB-killed DF were found near East Fork Reservoir, Moose Meadows, Silver King Mine, and northward into the Harvey Creek drainage. While there seems to have been a general decline in currently infested trees, DFB populations remain unusually high in many DF stands on the District. At higher elevations, SAF stands were impacted by WBBB, but were nearly insignificant when compared to DFB-caused mortality. Along the Clark Fork River, WPB-killed PP was noted, but in very widely scattered and light amounts.

DFB killed about 32,000 DF on almost 15,000 acres. MPB accounted for 5,100 dead LPP and another 370 PP on a combined 3,700 acres. WPB was activity noted on 1,500 acres.

For Deerlodge RA, MPB-infested LPP stands were found on more than 182,200 acres in 2005. Only 108,000 acres had been reported in 2004 and 31,000 acres in 2003. More than half a million LPP were killed last year, alone. Most infested LPP stands were on FS-administered lands. DFB infested another 20,400 acre (8,200 acres in 2004) and WBBB was recorded on 6,300 acres (4,000 in 2004).

Flathead Reporting Area

Swan Lake RD:

Significant increases in MPB-killed LPP were noted throughout the Swan Valley. Notably large groups were mapped west of Swan River south of Swan Lake on Swan River SF; and in North Fork Cedar Creek drainage, near Hemlock Point, south to Lindbergh Lake and in upper Swan River drainage near Pasture Lake.

To the east, in the Swan Range, MPB-killed trees were common in LPP and WBP stands from Goat Creek on the north to Pierce Lake on the south. Largest groups were mapped south of Lion Creek and just south of Holland Lake.

FE activity in mixed-species stands has declined somewhat but is still extensive in some stands north and east of Swan Lake. Very large, lightly infested (0.5-1 tree per acre) areas were mapped to the north, east, and south of Mud Lake. A few smaller groups were noted south of Swan Lake. DFB activity has declined, but a few beetle-killed groups of DF were found scattered throughout the Swan Range.

In the “Island Unit,” significant increases in MPB-infested LPP were recorded near Blacktail Mountain. FE activity has declined in that same general area, as well.

Generally, throughout that part of the District, there has been a marked increase in MPB activity. DFB-killed DF, and WBBB-infested SAF were recorded in a lightly scattered pattern throughout that part of the District.

Mixed-species stands of GF still contained noticeable amounts of FE-killed trees. More than 16,000 GF were killed on 7,500 acres. That was an increase from 2004, but not all the District was flown last year. MPB activity in LPP increased sharply—to 31,000 acres on which 63,000 trees were killed. Throughout the District, DFB killed 7,400 trees on about 3,400 acres. More than 7,500 SAF were killed on 4,400 acres.

Spotted Bear RD:

A few large groups MPB-killed LPP remained at some locations, but were much reduced from the past few years, both in extent and intensity. Large groups were mapped along Bruce Ridge, near Chipmunk Peak, and surrounding Meadow Creek Landing Strip; however, those averaged only about 0.5 trees per acre killed in 2004 (recorded as faders in 2005). Other groups were noted near Big Bull Mountain and in the upper reaches of Spotted Bear River and Dean Creek drainages. Noticeable amounts of WBBB-killed SAF were noted in high-elevation stands west of Hungry Horse Reservoir, especially near Three Eagles Mountain and Battery Mountain. A few similar groups were also mapped east of the Reservoir, near Mount Baptiste and Circus Peak. DFB activity very was only lightly scattered throughout the reporting area.

A set of 30, variable-radius plots that have been monitored yearly for the past 26 years, in the Cedar Creek area, south of Spotted Bear, showed an average 63 LPP per acre have been killed by MPB—mostly within the past 6-8 years.

District-wide, MPB infested LPP stands totaled 11,100 acres, on which almost 18,000 trees were killed. About 8,000 acres were recorded in 2004. DFB-affected stands on the District totaled just over 1,000 acres. Slightly more than 1,700 DF were killed. Only 200 acres had been reported in 2004.

Hungry Horse/Glacier View RD:

A variety of bark beetle activity—trees killed by MPB, DFB, FE—was noted in a generally lightly scattered pattern west of Hungry Horse Reservoir. None was of major significance. A few larger groups of SAF, killed by WBBB, were observed near Hash Mountain. North and east of the Reservoir, bark beetle activity was more prevalent. DFB remained active on Coram Experimental Forest near Martin City, though at levels reduced from previous years. WBBB-killed trees were very widely scattered throughout the Flathead Range, south to the District boundary.

MPB-infested LPP were found in large, though lightly infested groups in the southeastern portion of the District (Great Bear Wilderness). Largest of those groups were found northwest of Nimrod and throughout Middle Fork Flathead River drainage and its tributaries, south of John F. Stevens Canyon. Very large groups were mapped east of

Snowslip, along Patrol Ridge, and near Red Plume Mountain. Elsewhere, MPB-killed LPP was found in small groups generally scattered throughout the reporting area.

In 2005, MPB killed a reported 13,100 LPP and 80 WBP—both figures down from 35,000 LPP and 400 WBP killed in 2004. In 2004, that mortality was recorded on a combined 15,400 acres; that decreased to 12,200 acres in 2005. District-wide, on lands of all ownerships, WBBB infested almost 5,400 acres and FE 2,300 acres.

A general scattering of WBBB- and FE-killed trees were mapped on the Stillwater SF in the Whitefish Mountain Range. A few very large groups were recorded north of Whitefish Lake, but averaged only 1 tree per acre. A few MPB-killed LPP groups were also recorded. Ones near Meadow Lake, Beaver Lake, and Woods Lake were most noticeable.

On Forest Service-administered lands, in the North Fork Flathead River drainage (Glacier View RD), WBBB activity was very generally mapped throughout the District. Largest of those groups were noted in upper reaches of Coal Creek, Red Meadow Creek, and Whale Creek drainages. MPB-affected LPP and DFB-killed DF were very lightly scattered in host type throughout the District. More notable groups MPB-killed LPP were mapped along Dead Horse Ridge.

District-wide, MPB has infested more than 1,200 acres, DFB about 100, and WBBB nearly 5,000. Most are not major increases from 2004 levels.

Tally Lake RD:

An increase in MPB and DFB activity was combined with decreases in FE- and WBBB-caused mortality on the District in 2005. Several larger groups of DFB-killed DF were noted in the Logan Creek drainage, and near Tally Lake. They were generally larger, but less intensely infested than in 2004. Most groups covered a few hundred acres or less and contained an average 1-2 trees per acre killed. WBBB remained active near Sheppard Mountain, Elk Mountain, and above Bowen Creek, Robertson Creek, and Alder Creek drainages. MPB activity was observed in a lightly scattered pattern in a few LPP stands.

On District and adjacent lands, 4,600 acres (compared to 2,900 acres in 2004) showed some level of DFB-caused mortality; about 1,600 acres (900 acres in 2004) had MPB-killed LPP; only about 150 acres (6,200 acres last year) of FE-related activity; and less than 4,000 acres (7,700 acres in 2004) of WBBB-infested SAF.

Throughout the Flathead RA, and on lands of all ownerships, more than 62,500 acres have been infested by MPB (compared to 39,200 acres in 2004); 22,400 acres by FE (20,600 acres in 2004); 13,500 acres by DFB (5,700 acres last year); and 22,200 acres by WBBB (18,700 acres reported in 2004). Forest-wide, slightly less than 216,000 bark beetle-killed trees were recorded in 2005. Those were general increases over 2004 levels; however, more of the Forest was flown in 2005.

Gallatin Reporting Area

Big Timber RD:

DFB activity was much reduced in Boulder River drainage in 2005. Significantly large groups were still found near Aspen Campground, Speculator Creek, Four Mile Station and Hicks Park Campground. Elsewhere, DFB-killed groups were very widely scattered in small clusters.

Minor amounts of SAF, affected by WBBB, and MPB-killed WBP were noted in some locations; with more significant amounts of WBP, killed by MPB, being found in the upper portion of Boulder River drainage—especially near Wareagle Mountain, Baboon Mountain, and north of Boulder Pass. A few small groups of MPB-killed LPP were located near Burns Flat, in West Fork Boulder River drainage.

In the Crazy Mountains, relatively minor amounts DFB-killed DF and SAF infested by WBBB were recorded in Big Timber Creek drainage. One large group of WBBB-killed trees was observed near Twin Lakes.

DFB-infested stands totaled about 2,450 acres—most in the Boulder River drainage. Almost 1,900 DF were killed. MPB has killed 4,900 WBP on 1,640 acres; and 4,200 SAF were affected by WBBB on nearly 1,600 acres. All of those figures were increases over 2004 levels. Minor amounts of LPP were impacted by MPB, District-wide.

Livingston RD:

Widely scattered, small groups of DF, infested by DFB, were mapped both east and west of Paradise Valley. DFB activity was still concentrated in Mill Creek drainage, and while it has been much reduced from past years, infested acres increased in 2005. Groups there average generally less than about 80 trees each. Some few groups WBBB-killed SAF also noted in upper Mill Creek.

A few small groups DFB-killed DF were mapped to the west—a notable concentration was located north of Eight Mile Creek. Widely scattered WBBB activity was noted in the Gallatin Range, as well.

In the Crazy Mountains, scattered small groups of WBBB-, DFB-, and MPB-killed trees were observed. MPB activity was confined to WBP stands. The largest groups of MPB-affected WBP were noticed near Davey Butte. WSBW population increases in the Crazy Mountains could lead to resurgence of DFB activity.

DFB infestations on the District covered less than 700 acres in 2004, and increased to almost 2,400 acres in 2005. Approximately 7,000 DF were killed. MPB activity in WBP stands accounted for 1,200 dead trees on 1,350 acres. Nearly 11,000 WBBB-killed SAF

were noted on 4,600 acres. Both the latter were decreases from 2004. Little other beetle activity of note was found on the District.

Gardiner RD:

Only western portion of District was flown in 2005. There, widely scattered small groups DFB-killed DF, WBBB-affected SAF, and MPB-infested WBP were mapped. The largest groups DFB-killed trees were noted north and east of Jardine. WBP mortality was concentrated in several groups near Sheep Mountain, Ash Mountain and Mans Foot Mountain.

BR was reported as the most significantly damaging agent in WBP stands at several locations on the District; however, MPB and secondary bark beetles may also be affecting those trees.

Throughout the District, about 850 acres of DFB-infested stands were noted, up from 250 reported last year. Approximately 700 acres SAF were found to contain noticeable amounts of WBBB-caused mortality—down from 2,500 in 2004. On another 1,600 acres MPB killed close to 3,800 WBP—significantly less than the 7,000 killed on 4,300 acres in 2004. More than 1,800 acres were reported as affected by blister rust. Quite likely, many of those also contained MPB-caused mortality.

Bozeman RD:

Many groups of WBBB-infested SAF stands were found scattered throughout the Gallatin Range, and to a lesser extent the Madison Range to the west. In both areas, infestation levels were much less extensive that recorded in 2004. Largest groups and highest concentrations of WBBB activity were in the Gallatin Mountains near The Sentinel, Eaglehead Mountain, Fortress Mountain and Twin Peaks. Other smaller groups more generally scattered.

DFB-caused mortality was also widely scattered in small groups, with notable concentrations in Bear Creek drainage south of Mount Ellis and east of Bear Trap Canyon in Bear Trap Creek drainage. Several large groups of MPB-affected WBP were mapped in upper Cherry Creek drainage, southwest of Bozeman.

In the Bridger Mountains, DFB activity was widely scattered in small groups; but extensive WSBW outbreaks and extreme levels of defoliation could lead to a resurgence of DFB populations. A few small groups of SAF, infested by WBBB were also noted in the Bridgers.

In total, whereas MPB infested nearly 11,000 acres of WBP stands (and blister rust another 2,600 acres) in 2004; only 4,100 acres MPB, and 1,100 acres blister rust were recorded this year. Acres of WBBB-affected SAF stands were also reduced slightly—from 14,200 acres last year, to 11,800 acres in 2005; but mortality increased from 19,000 to 24,000 trees. DFB activity was noted on almost 800 acres (3,100 dead trees);

however, WSBW defoliation was reported on 76,700 acres in the Bridger Mountains. Many of those trees could attract DFB within the next few years.

Hebgen Lake RD:

DFB-killed trees were still commonly found on both north and south sides of Hebgen Lake, but at much reduced levels from past few years. Bigger concentrations were in Trapper Creek and West Fork Trapper Creek drainages, south of the Lake. North of Hebgen Lake, larger groups were noted in Cabin Creek and Beaver Creek drainages.

Numerous large groups of WBBB-infested SAF were mapped in the southern portion of the Madison Range; but much less was recorded this year than in 2004. Largest groups located just north of Hebgen Lake, in the Sage Creek drainage, and from Cinnamon Mountain northwestward to Lone Mountain. Other large groups were seen near Lincoln Mountain.

Of great significance was continued expansion of MPB activity in WBP stands. Large groups mapped were observed north of Hebgen Lake, near Tepee Basin; above Sage Creek; and north and east of Lightning Lake. Largest groups on the District were found from Lightning Lake eastward to Sage Creek. Minor amounts of MPB-caused mortality were also found widely scattered throughout LPP type.

District-wide, in addition to an estimated 28,400 WBP killed on approximately 24,500 acres in 2004; another 24,100 trees were killed in 11,600 acres in 2005. Those estimates may be conservative. Data collected on ten variable-radius plots near Lightning Lake in 2004 showed, for the area surveyed, more than 160 trees per acre had been killed in the past 2-3 years. DFB activity has declined to just over 1,800 acres, on which 4,400 dead DF were recorded.

For the entire Gallatin RA about 9,520 acres of DFB-infested DF stands were observed, compared to 4,520 in 2004. Another 200 acres of MPB-infested LPP were mapped. That was virtually a static condition. Almost 21,000 acres of MPB-killed WBP—a decrease from 49,000 acres last year—was noted (almost 38,000 WBP were killed); and about 26,600 acres on which WBBB-killed SAF was found were mapped. Nearly 48,100 acres of WBBB-caused mortality had been recorded in 2004.

Helena Reporting Area

Townsend RD:

DFB populations have begun to decline after several years of high populations following 2000 fires. Mostly small and very widely scattered groups of DFB-killed trees remained north of Townsend, in the vicinity of about Duck Creek north to Beaver Creek. A few larger groups were observed near Sunshine Basin, but overall, affected areas are much reduced. Extensive amounts of defoliation caused by WSBW on nearly 52,000 acres in

that same general area could result in increasing DFB populations if weather conditions further weaken affected trees.

MPB populations in both LPP and WBP stands continued to expand significantly throughout their respective hosts. Groups of beetle-killed trees ranging in size from 50 to 4,000 trees each were mapped from Hedges Mountain southward to Mount Edith. Especially in WBP stands near Boulder Mountain, Mount Baldy and Mount Edith, MPB-caused mortality has been extreme. Ground-collected data in the vicinity of Mount Edith showed in some areas nearly 70% of the WBP over 5" d.b.h. (more than 200 trees per acre) has been killed in the last three years. BR was also prevalent in those stands.

A few large groups WBBB-killed SAF were noted along and near Shellrock Ridge. West of Townsend, beetle-killed groups are small and very widely scattered in DF and LPP types.

District-wide, DFB-infested trees were observed on almost 2,300 acres (down from 6,800 last year); MPB-killed LPP on 8,700 acres (up significantly from 1,800 acres in 2004), and beetle-impacted PP on fewer than 30 acres, much less than the 730 acres previously reported. MPB-caused mortality in WBP stands was reported as totaling 18,300 trees on 7,800 acres—not significantly different that the 16,000 trees on 6,760 acres recorded in 2004. Many of those trees were also infected by BR. WBBB-caused mortality was recorded on about 300 acres. Just over 800 had been reported in 2004.

Helena RD:

MPB-caused mortality in PP was mapped in a very widely scattered pattern throughout stands north and south of Helena. Most groups were small, from 1 to 20 trees each. Highest concentrations were mapped south of Helena in the Little Buffalo Gulch and Whiteman Gulch areas. In those same areas, at higher elevations, MPB-killed LPP was also noted; however, most of those groups were small as well.

East of Helena, in the Tenmile Creek and Sweeney Creek drainages, MPB-infested LPP stands appeared to be increasing, although groups were still relatively small. DFB populations were still found affecting their hosts in small and widely scattered groups throughout DF type. That is another area, however, where extreme amounts of WSBW-caused defoliation could result in increasing DFB populations over the next few years.

Total DFB-infested area was about 1,200 acres—down from 2,200 acres last year. WSBW outbreaks on 16,100 acres could lead to DFB increased activity. MPB-killed trees were observed on 1,500 acres in LPP stands and another 930 acres in PP stands. WBBB killed SAF on another 550 acres, also reduced from 1,240 acres in 2004.

Lincoln RD:

A very general scattering of small groups of DFB-killed DF, MPB-killed LPP and WBBB-killed SAF were mapped in the Nevada-Ogden area southwest of Lincoln. No

significantly large groups were recorded—totaled but 1,300 acres, District-wide; however, large areas of DF defoliated by WSBW (totaling 19,000 acres) could lead to increases in DFB populations. Budworm populations were particularly high along the Continental Divide.

North of Lincoln, MPB populations appeared to be building in LPP stands in the Beaver Creek and Park Creek drainages and near Keep Cool Lakes—total for the District, about 1,900 acres. DFB-killed trees and a few groups of WBBB-killed SAF were mapped in the Arastra Creek drainage. Moderate-sized groups (up to 50 trees each) were noted near Stonewall Mountain and east of there, near Red Mountain, just north of Lewis and Clark Pass. WBBB totals for the District were 2,500 trees killed on 1,100 acres.

Throughout the Helena Reporting Area, and especially northwest of Helena, WSBW populations are increasing significantly. Defoliation, coupled with prolonged drought, could result in increased amounts of DFB activity within the next few years. Area-wide survey estimates for bark beetle-caused mortality for areas flown totaled: DFB 5,600 acres—compared to 10,800 acres last year; MPB 24,800 acres (19,400 acres in 2004), of which 13,300 acres were LPP, 2,000 PP, and 8,600 WBP (almost 45,000 trees, of all species were killed); and WBBB about 3,400 acres—almost no change from 3,200 acres last year.

Kootenai Reporting Area

Rexford RD:

DFB populations have returned to near-endemic levels throughout the District. Very small and very widely scattered groups were found at a few locations in DF or mixed-conifer stands. A few larger groups remained in the Pinkham Creek drainage and especially near Virginia Hill, but most are 20- to 30-tree groups, or smaller. WBBB-infested SAF were also found in mostly small groups. A few larger ones were located near McGuire and Ellsworth Mountains to the east and Boulder Mountain to the west. Some small groups FE-killed GF were mapped at a few somewhat isolated locations. A small number of fairly large groups of MPB-killed WBP were observed near Robinson Mountain.

Fortine RD:

DFB activity declined on the District once again in 2005. Beetle-killed groups were few, small, and widely scattered. Some of the larger groups were mapped in Sunday Creek drainage and its tributaries, south of Fortine. North of Fortine, in the Galton Range, DFB populations also declined markedly. Several large groups of WBBB-impacted SAF were mapped near Stahl Peak and Krag Peak. MPB-caused mortality in WBP increased near Kasanka Peak, north of Stahl Peak, and surrounding Mount Wam. Another group was located to the south near Mount Petery.

Totals for the District showed about 1,500 acres of DFB-killed DF (approximately 2 trees per acre); 700 acres of MPB-impacted LPP and another 900 WBP (average one tree per acre, each); and 2,200 SAF were killed by WBBB on 1,800 acres.

Three Rivers RD:

DFB activity declined throughout the District in 2005. Beetle-caused mortality was still noticeable in small and scattered groups in DF type; but at a much reduced level from recent years. FE-killed GF was frequently encountered, although not in extreme amounts. A few of those larger groups were noted near and east of Yaak Mountain.

Most prevalent bark beetle activity on the District was attributed to WBBB. Larger beetle-killed groups of SAF were mapped near Marmot Mountain, Rock Candy Mountain, and Pink Mountain.

MPB-caused mortality in both WWP and WBP was also noted in significant-sized groups throughout the Yaak River drainage. Notable groups in WWP were mapped near Grizzly Point and Garver Mountain. WBP damage was more prevalent near Cross Mountain and Tepee Mountain. BR infections, common in the WWP type, were also associated with MPB activity. South of Troy, only very light and widely scattered bark beetle activity was observed.

District wide, about 900 DF were killed by DFB on 300 acres—down from 4,400 trees on 1,300 acres in 2004; WBBB killed 4,600 SAF on 5,700 acres—up markedly from 2,400 acres and 1,900 trees last year; and 1,200 FE-killed GF on were noted on 700 acres—both slight increases. MPB-killed trees were recorded on 1,200 acres of LPP stands; 1,700 acres of WBP; and another 1,000 acres of WWP. More than 9,100 WBP; 2,800 LPP; and 350 WWP were killed.

Libby RD:

Bark beetle activity of all species, in their respective hosts, was greatly reduced throughout the District in 2005. Nearly endemic amounts of DFB activity were recorded both north and south of Libby—totaling but 1,200 acres. FE activity is more common, but reduced from 2004 levels—4,600 acres compared to 7,800 acres. Notable concentrations were mapped south of Libby in the Cameron Creek drainage, and to the north in Quartz Creek and Bobtail Creek drainages. Minor amounts of MPB-killed trees were noted at a few isolated locations in WPB, WWP, and LPP stands.

Beetle-infested stands on the District totaled: DFB, 1,200 acres—3,000 dead DF; FE, 4,600 acres—7,300 beetle-killed GF; MPB (all hosts, but mostly LPP), fewer than 300 acres; and minor amounts of WBBB- and WPB-caused mortality.

Cabinet RD:

As DFB populations, and associated damage returned to near-normal levels; MPB-killed LPP was increasing in parts of the District. Small amounts of DFB-killed trees were noted in Stevens Creek and Pilgrim Creek drainages and to the north in Rock Creek drainage and near Government Mountain. Significant, however, were large groups of MPB-infested LPP mapped in Little Beaver Creek and White Pine Creek drainages south of the Clark Fork River, and throughout the Vermilion River and its tributaries to the north. These infested areas increased markedly just within the last year or so.

FE activity was still noted in a few GF or mixed-species stands, with a few of the larger groups mapped in the upper Trout Creek drainage. WSBW activity on the District, not recorded in the past quarter century, was heavy in some stands and could lead to an increase in DFB activity within the next few years.

District-wide, DFB-killed DF was found on 220 acres; MPB infested 30,300 LPP on 9,400 acres and another 400 WWP on 620 acres; FE killed 1,300 GF on 2,000 acres; and WBBB activity was minor.

Total mortality attributed to bark beetles in the Kootenai RA in 2004 was: 12,000 DF killed by DFB on 5,400 acres (21,000 trees on 9,100 acres in 2004); 11,000 GF killed by FE on 7,700 acres (8,500 trees and 9,100 acres in 2004); 34,200 LPP killed by MPB on 11,500 acres (10,400 trees on 1,500 acres last year); 16,500 WBP and 1,700 WWP killed by MPB on a combined 17,200 acres; and 13,000 SAF killed by WBBB on 12,400 acres (5,700 acres in 2004). Minor amounts of mortality attributed to IPS were also recorded in 2005.

Lewis & Clark Reporting Area

Rocky Mountain RD:

District was not flown in 2005 nor has it been for the past several years. We have no current record of bark beetle activity on the District.

Judith RD:

A very general scattering of mostly small groups of beetle-killed trees were noted throughout the District during the past year. Most activity was recorded as MPB-killed PP, found in small groups north and east of the Little Belt Mountains. Many of those groups were concentrated throughout the South and Middle Forks of the Judith River. Other noticeable groups were observed in the Running Wolf, North Fork Running Wolf, and Dry Creek drainages.

Significant groups of MPB-infested WBP were found in the central portion of the District—especially near Yogo Peak, Tepee Butte, and Kelly Mountain. WBBB activity was recorded near Big Bald Mountain, Yogo Peak, Tepee Butte, and Big Bear Point. In the Highwood Mountains, very light and widely scattered groups of DFB-killed DF and

MPB-impacted LPP were noted. A small amount of MPB-infested PP was recorded in the Big Snowy Mountains.

On BLM-administered land north of Lewistown, in the Judith and North and South Mocassin Mountains, very widely scattered MPB-caused mortality was noted in a few PP stands. Most were small groups; a few were as large as 150 trees, but most were less than 100.

District-wide, DFB was found on 240 acres (350 acres last year); MPB on almost 3,900 acres—on all hosts, but most was PP (nearly static conditions); WBBB on nearly 1,250—2,000 acres in 2004; and BR on another 2,300 acres (4,750 acres last year). Most of that latter was probably also infested by MPB.

Musselshell RD:

Widely scattered small groups of trees killed by several bark beetle species were recorded in the Little Belt and Castle Mountains. Numerous, though mostly small, groups DFB-killed DF were recorded from Green Mountain eastward to Bluff Mountain. MPB-caused mortality in PP and LP stands was common from Bartleson Peak east to Farmer Spring. MPB-killed WBP was prevalent in higher-elevation stands to the west—especially big groups were mapped near Hoover Mountain, Smoky Mountain, and along Lost Fork Ridge. MPB-infested LPP stands were also common in some larger groups, north of Lake Sutherlin and in the Castle Mountains. Significant WSBW activity throughout the area could lead to increases in DFB populations.

In the Crazy Mountains, widely scattered small groups of WBBB-infested SAF and MPB-impacted WBP were observed. Small amounts of DFB-killed DF were also noted. MPB activity in WBP stands was concentrated near Box Canyon and south of Mount Elmo. Numerous small groups of WBBB-killed trees were found near Loco Mountain. Small amounts of MPB-killed trees were noted in LPP type.

Throughout the District, about 1,600 PP were killed by MPB on roughly 1,400 acres. Both figures were reduced from 2004 levels of 2,100 trees on 2,700 acres. DFB killed 2,050 trees on 770 acres—also reduced from 1,080 acres and 2,700 trees last year. MPB and blister rust affected WBP and LP on more than 2,600 acres (6,400 acres in 2004); and MPB alone on 1,000 acres of LPP—the same as last year. WBBB killed 2,200 trees on 1,200 acres—fewer than previously recorded.

Kings Hill RD:

Widely dispersed and mostly small groups of DFB-infested DF, WBBB-affected SAF, and MPB-killed LPP were noted throughout the reporting area. Notably larger groups of MPB-killed WBP were located near Kings Hill and south of Mizpah Peak. Larger groups MPB-infested PP were also noted to the north, near Logging Creek and in the Sawmill Gulch and Logging Creek drainages.

MPB was also active in PP stands to the west, in Tenderfoot Creek drainage. MPB activity in LPP stands was mapped as small groups to the south, near Miller Gulch. WSBW activity, common in southern Little Belts, could precipitate increased DFB populations.

Totals for the District were about 6,000 SAF killed on more than 2,100 acres (more trees, fewer acres than last year); 3,000 PP and 10,400 LPP killed by MPB on 1,600 acres and 3,300 acres, respectively (fewer totals for PP, more for LPP); MPB and blister rust have affected WBP on more than 3,900 acres, and DFB killed 2,400 trees on 1,400 acres. Those latter figures represent a decline in WBP mortality, and an increase in DFB activity.

Area-wide mortality attributed to bark beetles in the Lewis & Clark RA totaled almost 5,700 DF on 2,600 acres (virtually static conditions from 2004); and 41,100 MPB-killed trees on 20,300 acres—of all hosts, roughly one-third each of LPP, PP, and WBP. Very similar figures were reported in 2004. Another 12,200 SAF were killed on 4,500 acres (9,700 acres in 2004).

Lolo Reporting Area

Missoula RD:

DFB-killed DF were still quite prevalent throughout Rock Creek drainage, but groups were much smaller and more widely scattered than in the past few years. Largest groups were recorded near Burnt and Golden Mountains in the north, near Spink Point and in the Butte Cabin Creek drainage in the central part of the Corridor, and in the Hogback Creek drainage to the south. Although fader groups were numerous, ground surveys suggested fewer currently infested trees in most areas in 2005 than in previous 2-3 years. Throughout the District, on lands of all ownerships, 20,600 DF were killed on 6,700 acres. About 4,700 acres had been recorded in 2004.

In the northern end of the Sapphire Mountains, from Mitten Mountain to Elk Mountain, southeast of Missoula, MPB-killed LPP has increased significantly. Numerous groups were mapped in that area, many covering several hundred acres and containing 3-5 beetle-killed trees in each.

North of Missoula, in the Rattlesnake Creek drainage, MPB-infested LPP was also quite prevalent. Largest groups were observed near Blue Point, Stuart Peak, Shoofly Meadows, and southwest of Bull Lake. To the west of Missoula, in the Grave Creek Range, MPB activity in LPP stands also increased—from Blue Mountain to Telephone Butte. A few groups of faders extended to several hundred acres each.

District totals in 2004 included 11,200 acres of MPB-killed trees (mostly LPP). Those infested acres increased in 2005 to 15,800; on which more than 66,000 trees were killed. Lesser amounts of MPB in PP and WBP and WBBB in SAF were reported in 2005.

Ninemile RD:

MPB activity in LPP stands was the most dominant insect infestation on the District in 2005. While having declined somewhat from 2004 levels, due to host depletion, thousands of acres were still infested—the most extensive outbreaks being along the divide between Flathead IR and the District. Very large polygons were mapped from upper Sixmile Creek, northwest to Three Lakes Peak. South of Ninemile Creek, and along Ninemile Divide, additional large groups of beetle-killed trees were mapped—from Stark Creek to Mattie Creek. The outbreak has finally run its course near Siegel Pass, where few infested trees were noted. Ground-collected data, for a 10-plot area near Siegel Pass showed an average 187 trees per acre had been killed by MPB over the past several years.

Elsewhere throughout the Ninemile Creek drainage, minor amounts of DFB-infested DF, and MPB-caused mortality in both PP and WPB stands was observed. No significant outbreaks of those were noted, however.

South of the Clark Fork River, in Albert Creek, Petty Creek, Fish Creek, Rock Creek, and Trout Creek drainages, significant groups of MPB-killed LPP was recorded. Largest groups were mapped in Fish Creek, Rock Creek, and Trout Creek drainages near White Man Lookout, McMullan Peak, Patrick Peak, Sunrise Mountain and Prospect Mountain. Minor amounts of WBBB, DFB, and MPB (in PP stands) activity was reported south of the Clark Fork River.

In 2005, throughout the District, more than 438,000 LPP were killed by MPB on nearly 50,000 acres. MPB killed another 2,600 PP on 2,500 acres; 1,300 DF were killed by DFB on 420 acres; and WBBB killed 150 trees on 220 acres. A minor amount of WPB activity was also noted.

Plains/Thompson Falls RD:

Much of this District was not flown in 2004, so direct comparisons with last year cannot be made. MPB-caused mortality in LPP, while still very extensive, declined in many stands due to host depletion. Largest groups remained in Coeur d'Alene Mountains west of Plains and South of Thompson Falls. Most extensively infested areas in that portion of the District were still from Knox Pass, west to Taft Summit, along the divide with Superior RD to the south. To the east, towards Sunset Peak and Combest Peak, infested groups were much smaller. Ground-collected data for a 10-plot area near Mount Bushnell showed an average 120 trees per acre killed by MPB during the past 5 years.

North of the Clark Fork River, outbreaks increased throughout the Thompson River drainage. Large groups of faders were mapped on the east from Big Rock Creek south to Baldy Lake, and contained especially high amounts of mortality in McGinnis Creek and along Corona Divide. Data collected from variable-radius plots near Mount Baldy and

Corona Divide, showed an average 150 and 53 LPP, killed by MPB, respectively over the last few years.

To the west, large groups were mapped in the Fish Trap Creek drainage, particularly near Two Trees Point, Lone Tree Peak, Marmot Peak and Duckhead Lake. Northwest of there, several large groups were observed in Winniemuck Creek drainage, and near Cougar Peak. A few groups MPB-killed WBP were also recorded near Marmot Peak. Minor amounts of WBBB- and DFB-killed trees were recorded in appropriate host types. Small amounts of MPB activity in LPP, PP, and WPB stands was reported east of Paradise.

Totals for the District and adjacent State and private lands in 2005 showed 408,000 MPB-killed trees on more than 64,800 acres—most of which were in LPP stands; about 750 acres infested by DFB; 910 acres with WBBB-caused mortality; and about 50 acres infested by WPB. We obtained almost no data for 2004, but those MPB-infested figures are considerably higher than recorded in 2003. DFB, WBBB, and WPB were nearly static.

Seeley Lake RD:

MPB-caused mortality was prevalent in a few small groups of LPP south and west of Seeley Lake, particularly in Placid Creek and Finley Creek drainages. To the east and north of Seeley Lake, in the vicinity of Richmond Peak and near Florence Lake, larger groups of LPP had been killed by MPB. WBP heavily impacted by MPB, was noted in several large groups near Morrell Mountain, near East Spread Mountain, and close to Conger Point. To the west, other groups were seen near Mount Henry and West Fork Point. MPB infestations in LPP intensified in 2005. MPB-affected stands totaled about 9,850 (2,000 acres in 2004) of LPP, where MPB was the sole mortality agent, and another 12,600 acres (8,900 acres last year) of WBP with mortality attributed to both MPB and BR.

Elsewhere on the District, DFB-killed trees were more widely scattered and in smaller groups in 2005. Throughout the DF type, DFB-caused mortality increased only slightly, to 1,100 acres. About 1,060 acres were reported in 2004. WBBB-caused mortality was observed on nearly 620 acres (400 acres last year) in a few high-elevation SAF stands. Minor amounts of MPB-killed PP were also noted on the District.

Superior RD:

Large groups of MPB-killed LPP were mapped from near Chimney Rock, southwestward to Prospect Creek. Elsewhere, south of the Clark Fork and St. Regis Rivers, very large groups of MPB-killed LPP—some totaling hundreds of thousands of trees—were mapped from Cedar Creek on the east to Lookout Pass on the west. North of the St. Regis River, throughout the Coeur d'Alene Mountains, largest beetle-infested groups were recorded near Brooks Mountain, Knox Pass, and Mount Bushnell—on the divide between Superior and Plains/Thompson Falls RDs. District-wide more than 47,200 acres were infested in

2003. We believe most of those outbreaks continued to expand in 2004, but in some of the areas that have been infested for several years, there likely was a decrease in intensity. Ground-collected data for a few sites on the District showed extreme amounts of MPB-caused mortality in LPP stands during the past few years: East Fork Dry Creek, 138 trees per acre; CC Divide, 103 trees per acre; Dry Creek (permanent plots), 143 trees per acre. MPB-caused mortality in LPP stands on the District totaled 453,300 trees on 64,000 acres.

Significant amounts of MPB-caused mortality were recorded in PP stands east of Superior, from Round Mountain northwest to Sloway Gulch. Largest groups were noted in First and Second Creek drainages. Acres with noticeable amounts of PP mortality declined somewhat, but still totaled about 400 acres. At least some of that mortality is thought to be drought related. Ground surveys showed still-increasing populations in many areas. In some, host depletion has resulted in population declines; however, in a few areas surveyed, 2004 attacks averaged more than 120 per acre. MPB affected PP on just over 1,000 acres where 2,300 trees were killed. Relatively minor amounts of other bark beetle-killed trees were reported.

Throughout the Lolo RA—the most heavily impacted in the State—MPB killed LPP more than 1.4 million LPP on 204,400 acres; 9,600 PP killed on 5,400 acres; and nearly 10,800 WBP on 7,800 acres (however, most of those acres were also reported as affected by blister rust). Although much less significant, DFB reportedly killed about 31,000 DF on 10,400 acres; WPB killed 120 PP on 135 acres; WBBB accounted for 3,700 dead SAF on 2,600 acres, and FE killed 2,600 GF on nearly 2,700 acres. A very minor amount of IPS activity was also reported.

Garnet Reporting Area (BLM)

Greatly increased amounts of MPB-killed LPP were recorded throughout the reporting area. Larger groups were mapped from the western side, near Bonner Mountain, eastward towards Mammoth Mine and Lost Horse Mountain; then to the eastern portion, near Gravely Mountain. Most LPP stands appeared to be infested to a greater or lesser degree. To a much lesser extent, and in much smaller groups, MPB-killed PP was also mapped in a widely scattered pattern. DFB-infested DF was also found in many mixed-species stands, but large groups were uncommon. Some of the largest of those were noted near Union Peak. Increasing WSBW populations could exacerbate that situation. WBBB-affected SAF stands were widely found in small groups in high-elevation sites. The more noticeable of those were recorded near Elevation Mountain.

In total, about 7,800 DF were killed on 3,200 acres—slight increases over 7,200 trees and 2,600 acres recorded in 2004; MPB killed approximately 18,500 LPP and 930 PP on a combined 12,600 acres (9,800 LPP and 570 PP on 5,500 acres last year); and 920 dead SAF on 440 acres (up slightly from 280 acres last year) were attributed to WBBB. Most significant increases in the area were in MPB-killed LPP.

Indian Reservations

Blackfeet IR:

The Reservation was not flown in 2005, however in 2004, the western portion was surveyed along with Glacier NP. Last year, a few small groups of DFB-killed DF and MPB/IPS-killed LPP were mapped near Lower Saint Mary Lake. The most significant bark beetle-caused damage, however, was several large groups of SAF, killed by WBBB, recorded near Cut Bank Ridge and in upper tributaries of North Fork Cut Bank Creek. On the part of the Reservation flown in 2004, an estimated 4,000 SAF were killed on about 2,600 acres.

Crow IR:

Very small and widely scattered groups IPS-killed PP were observed throughout the Wolf Mountains, east of Lodge Grass. The largest group, of about 400 trees, was mapped north of Shortys Hill in the Corral Creek drainage.

In the Pryor Mountains, to the west, numerous groups of WBBB-killed SAF were mapped in higher-elevation tributaries of Pryor Creek. Minor amounts of MPB-killed LPP, LP and PP were found at a few locations. IPS-killed PP and DFB-killed DF were recorded at nearly endemic levels.

Throughout the Reservation, 227 PP were killed by MPB on 140 acres; 110 LP were killed by MPB on 100 acres; 150 MPB-killed LPP were noted on 100 acres; DFB killed 110 DF on 40 acres; and 640 SAF were killed by WBBB on 330 acres. Those totals were not significantly different from 2004.

Flathead IR:

MPB-caused mortality increased remarkably throughout LPP stands on the Reservation. In the Mission Range, east of Flathead Lake, the infested area increased significantly. Large groups of beetle-killed trees were mapped from Yellow Bay Creek on the north, south to the Reservation boundary at the Rattlesnake Wilderness. Very large groups, some exceeding 3-4,000 acres each were recorded throughout the Jocko River drainage and its tributaries in the southeastern portion of the Reservation. Some larger groups averaged 5 trees per acre killed in 2004 (recorded as faders during surveys in 2005).

Outbreaks remained high, although somewhat reduced from past years to the south, along Reservation Divide. Very large groups were still found near Saddle Mountain, in the Valley Creek drainage, and west of Warden Mountain.

To the west, large MPB-killed groups of LPP were recorded in the vicinity of Rainbow Lake, Hot Springs and northward towards Mill Creek and Bassoo Peak.

Elsewhere, MPB-killed PP was found quite generally throughout PP type, though in much smaller groups. Highest concentrations found to the south in the Hewolf Creek drainage, northward to Sonyok Mountain, Coppedge Gulch and north through the Salish Mountains to just south of Lake Mary Ronan. Some MPB-infested PP and FE-killed GF were found lightly scattered in foothills of the Mission Mountains, east of Flathead Lake. Some IPS and WPB activity was also recorded in a few PP stands; however, there may have been more that was recorded, either in conjunction with MPB, or recorded as MPB. Minor amounts of WBBB-killed SAF were mapped in a few high-elevation stands to the southeast.

Because not all of the Reservation was flown in 2004, comparison figures for beetle-infested areas could not be made in 2005. This year, total beetle-infested areas on the Reservation included 410 DF killed on 200 acres; 11,400 PP and 230 WBP killed by MPB on 15,100 1,300 acres, respectively; 6,200 SAF killed on 6,000 acres by WBBB; and FE killed almost 6,200 GF on 5,600 acres. The most significant damage recorded, however, was the 214,800 LPP killed by MPB on nearly 90,600 acres. That was a considerable increase over the infested area recorded in 2004; but again, not all of the Reservation was flown in either 2003 or 2004.

Fort Belknap IR:

The Reservation was not surveyed in 2005; however, conditions were likely little changed from those observed in 2004. Very widely scattered and generally small groups of MPB-killed PP and LPP were mapped across the Reservation last year. Groups ranged in size from 1-150 trees, with concentrations noted near Thornhill Butte, Eagle Child Mountain, and near Mission Peak. Most of the latter were small groups of LPP. The largest of those contained an estimated 25 trees. About 530 PP were killed on slightly fewer than 160 acres. Another 125 LPP were killed on about 40 acres. Both of those figures represented nearly static conditions.

Northern Cheyenne IR:

Minor amounts of IPS-killed PP, recorded in very small groups, were mapped in a widely dispersed pattern throughout the Reservation. Largest groups were found east of Hollowood Creek, and north of Busby. Populations appeared to be not much higher than endemic levels. Some beetle-caused mortality may have been caused by MPB.

Reservation-wide, about 4,400 PP on 2,200 acres were recorded as having been killed by IPS. Another 110 PP on 175 acres were killed by MPB. Those are figures represented decreases in MPB-infested areas, but increases in IPS-infested ones. It is conceivable that there is more interaction between MPB and IPS in PP stands on the Reservation than can be detected from the air.

Rocky Boys IR:

A few moderately-sized groups of MPB-killed trees, in both LPP and PP stands, were found south of Tribal headquarters, in stands on Black Mountain, Centennial Mountain, and Sawmill Butte. Largest groups were recorded in LPP stands on Black Mountain—especially in the vicinity of Black Canyon. PP groups were generally much smaller. A few small groups DFB-infested DF were mapped near Lost Canyon. Generally fewer beetle infested groups were noted in 2005 in areas being aggressively managed to reduce the number of beetle-infested trees and threatened stands.

Slightly more than 3,100 beetle-killed LPP were mapped on about 930 acres—a marked increase from the 200 acres reported in 2004. Another 320 PP were killed on 330 acres, but there may have been more beetle activity in PP stands than reflected in this year's estimates. DFB killed about 400 trees on 160 acres—a slight increase over data recorded last year.

National Parks

Glacier NP:

Glacier NP was not flown in 2005. The report for 2004, probably not changed significantly, is reproduced here.

Within the past 2-3 years, wildfires have affected thousands of acres of forested stands, in the western, central, and southern portions of the Park. Associated with some of those were increasing amounts of DFB-caused mortality—observed in many widely scattered locations, but near many burned stands, particularly near Kintla, Bowman, Quartz, and Logging Lakes. In response to drought-induced damage, FE populations have built in GF stands at several locations in the Park. The largest of those was located in the Pinchot Creek drainage. And MPB-killed LPP was noted in small and very scattered groups throughout LPP type.

Most significant amounts of beetle-caused mortality in the Park were large groups of SAF killed by WBBB. Largest of those was mapped near Logging Mountain; however, several other large groups were observed in high-elevation stands.

Park totals for 2004, included 5,100 DF killed by DFB on 3,300 acres; 4,800 GF killed by FE on 4,050 acres; 720 of various MPB hosts were killed on 850 acres; and WBBB killed 18,300 SAF on just over 8,200 acres. All outbreaks increased over previously recorded figures.

Yellowstone NP:

Yellowstone NP, not surveyed in 2004, was once again flown in 2005. Remnants of a large ESB outbreak, southeast of Yellowstone Lake, recorded at more than 8,000 acres in 2003 has been reduced to but a few thousand acres.

Minor amounts of MPB-killed LPP, DFB-infested DF, and WBBB-affected SAF stands were mapped in a widely scattered pattern at various locations throughout the Park. In contrast, significant outbreaks of MPB in WBP stands were mapped in the southeast portion of the Park, from Lynx Creek north to Avalanche Peak. Largest groups were noted around Colter Peak, Mount Langford, and Sylvan Pass. Other large groups were recorded near Frederick Peak and Mount Washburn. In the northwest part of the Park, other significant groups of MPB-killed WBP, interspersed with WBBB-killed SAF, were noted near Dome Mountain, Bannock Peak, Little Quadrant Mountain, and Meldrum Mountain. Minor amounts of DFB could be exacerbated by increasing populations of WSBW in the vicinity of Mammoth.

In 2004, ground observations detected a very large MPB outbreak in WBP stands in the vicinity of Avalanche Peak. Ground-collected data in that area showed an average 95 WBP per acre killed within the past 2-3 years.

Beetle-killed totals for the Park, in 2005, included 860 DF, attributed to DFB on 350 acres; 2,100 ES on 1,800 acres killed by ESB; 1,650 LPP on 1,300 acres killed by MPB; 365,200 WBP killed by MPB on 29,200 acres; and finally, 24,300 SAF were killed by WBBB on 11,690 acres. The biggest increases since 2003, by far, were noted in MPB-killed WBP. Other beetle-caused mortality rose only slightly, or declined.

BARK BEETLE-RELATED SPECIAL PROJECTS--MONTANA

Evaluating the Effectiveness of Thinning Treatments on DFB-Caused Tree Mortality

A long-term thinning study in DF stands on the Helena, Lewis & Clark, and Bitterroot NFs was initiated in 2005, in cooperation with Jose Negron (RMRS), to evaluate effectiveness of two thinning treatments on DFB populations and associated tree mortality. Replicated treatments consist of (1) basal area reductions and (2) using stand density index (SDI) treatments to maintain or approximate uneven-aged stand conditions. Basal area reduction treatments will be included in ongoing projects on all three forests; SDI treatments will be evaluated on the Helena and Lewis & Clark NFs only. Evaluations are in varying phases dependent upon project status on each forest. Treatments were initiated in 2005. Implemented will be completed in 2006. Post-treatment evaluations will be conducted during 2006 and 2007, and at 5-year intervals thereafter.

For additional information, contact Nancy Sturdevant, MFO.

Determining Area of Protection of DFB Pheromone-Baited Traps at Varying Beetle Population Densities

Three stands were selected on the Deerlodge NF and 2 on the Beaverhead NF that had outbreak DFB populations. Trap placements consisted of 3 sets of 3 Lindgren funnel traps randomly assigned in a triangular arrangement. Traps within clusters were 10 m apart and clusters 201 m apart. Traps were hung in mid-April, located in areas containing non-host trees or older mortality. Pheromone baits were replaced after 8 weeks.

We collected in excess of one million DFB from 4 sites on the Deerlodge NF and more than 800,000 from 4 sites on the Beaverhead NF. DFB-caused tree mortality was recorded on a 2-acre circular plot within the interior of the triangle formed by funnel trap clusters. A 100% survey of all trees was conducted within the plot to assess current beetle-caused mortality.

Data showed in 2004, there was a median 12% of the trees attacked on the Beaverhead untreated plots and 9% attacked on treated plots. Deerlodge plots had a median 21% attacked on treated plots and 7% attacked on untreated plots. In 2005, untreated Beaverhead plots had a median of 4% attacked and treated plots 6%. Untreated Deerlodge plots a median 5% attacked with 17% attacked on treated plots.

Pheromone traps can remove large numbers of beetles from infested areas. "Spill-over," however may be unacceptably high in some stands; and trapping may have increased DFB populations in trapped areas. Because trap-out strategies may increase beetle

activity; silvicultural manipulations, such as sanitation/salvage and hazard reduction, may also be necessary to reduce beetle-caused mortality to more acceptable levels.

Contact Nancy Sturdevant, MFO, for additional information.

Can Pheromone Trap Catches Reduce DFB-Caused Mortality:

Cooperative project with Kimberly Wallin (OSU, Corvallis, OR) in trying to determine how much DFB-caused mortality occurs around pheromone-baited funnel traps—and if trap placement affects mortality in adjacent DF stands. Ten pairs of traps, in 2 DFB population densities (moderate and high) placed in DF stands in southwestern Montana (Sula and Stevensville RDs, Bitterroot NF). DFB-infestation data were collected in August 2005. Trap catches and other data are being analyzed.

For additional information, contact Ken Gibson, MFO.

Testing Efficacy of Verbenone Pouch in Reducing MPB-Caused Mortality in LPP:

A project was established in LPP stands on the Butte RD, Beaverhead-Deerlodge NF, in an attempt to determine the efficacy of a new, experimental, 7.5-gram verbenone pouch in protecting trees from MPB attack. An additional treatment, the addition of hexanol pouches would also be assessed. In a randomly assigned treatment (by block) test, we selected three 1-acre plots in each of 6 blocks. Treatments consisted of no treatment (controls); 20, 7.5-gram pouches (Synergy Semiochemicals, Inc.) per acre; or 20, 7.5-gram verbenone pouches per acre, plus 20, 10-gram hexanol pouches per acre. Pouches were stapled to individual trees in a grid pattern (approximately ½-chain apart at 40/acre; about ¾-chain apart at 20/acre). A baited funnel trap was hung at the center of each plot. Stands were treated in late June and were to be evaluated in late September.

Unfortunately, the pouches were incorrectly applied. No treatment results were obtained. We hope to re-do the test, in similar stands in the same area in 2006.

For additional information, contact Ken Gibson, MFO; or Sandy Kegley, CFO.

Testing Efficacy of Verbenone Pouch in Reducing MPB-Caused Mortality in LPP:

An individual-tree test, comprised of the same treatments as the area test, was conducted in LPP stands on Butte RD. One hundred fifty trees were selected in June. Fifty of each were treated with no pouches (controls); 2, 7.5-gram verbenone pouches per tree; and 1, 7.5-gram verbenone pouch and 1, 10-gram hexanol pouch per tree to test the efficacy of either treatment in reducing MPB-caused mortality in high-value trees. Trees were treated in late June. Those pouches were also applied incorrectly. We hope to conduct the test again in the same area, in 2006.

For additional information, contact Ken Gibson, MFO; or Sandy Kegley, CFO.

Testing Efficacy of Masterline, Onyx, and Sevin in Protecting Individual LPP from MPB Attack:

In mid-June 2004, 150 LPP were selected as part of an evaluation of another potential replacement for Sevin (carbaryl) insecticide in protecting individual LPP from MPB attack. The insecticide under evaluation was Masterline (permethrin +C), a synthetic pyrethroid. In addition, we again evaluated the registered rate (0.06%) of Onyx (bifenthrin); and we applied 2% Sevin (carbaryl) as the "standard." Control trees were selected for both 2004 and 2005 (second-year protection). This project was under the direction of Chris Fettig, Research Entomologist, PSW, Davis, CA.

Trees were selected on the Jefferson RD, Beaverhead-Deerlodge NF, east of Butte. Groups of thirty trees each, comprised five treatments: 0.06% Onyx, 0.2% Masterline, 2% Sevin SL, check ('04), and check ('05). Trees were treated June 15-17, 2004 and evaluated in mid-September, following beetle flight. First-year results are shown in table below.

	Control	**Onyx**	**Masterline**	**Sevin**
Attacked	30	1	2	0
Not Attacked	0	29	28	30
% Mortality	100	3.4	6.7	0

Remaining live trees were re-baited in June 2005 and evaluated in September. Study indicated both Onyx and Masterline were effective for one year, but not a second. We also re-affirmed Sevin's effectiveness for 2 years. Results are shown below.

	Control	**Onyx**	**Masterline**	**Sevin**
Attacked	30	20	14	1
Not Attacked	8	8	13	29
% Mortality	73.3	71.4	51.8	3.3

For additional information, contact Ken Gibson, MFO.

BARK BEETLE CONDITIONS IN IDAHO

Clearwater Reporting Area

Pierce RD:

Very widely scattered and mostly small groups of DFB-killed DF were mapped throughout host type on the District. Greatest concentrations of beetle-killed groups were noted near Elk Mountain. Minor amounts of MPB-killed LPP and FE-infested GF were likewise widely reported throughout the reporting area.

Large groups of balsam wooly adelgid, *Adelges piceae* (Ratzeburg), (BWA) were noted at several locations, most notably near Hemlock Butte and Liz Butte. While mortality has been attributed to BWA, it is not inconceivable that one or more species of bark beetles are associated with those outbreaks.

On State and private lands north and east of Kooskia, small and very widely scattered groups DFB-infested DF were note; the largest of those were near Eldorado Ridge. Elsewhere, DFB activity was recorded north of Headquarters and on State and private lands just north of the District boundary. Small amounts FE-killed GF and a few larger groups of BWA-infested SAF were noted in that area. Larger groups of SAF and GF, affected by BWA were also observed east of Headquarters.

District totals are combined with North Fork RD (below).

Palouse RD:

Very generally and sparsely scattered, mostly small groups (5-10 trees each) FE-infested GF, WPB-killed PP, and DFB-affected DF were mapped throughout the reporting area—comprised of Federal, State, and private lands. Concentrated groups of DF, killed by DFB, were found south and west of Elk City. FE and WPB activity, in their respective hosts was observed in a more broadly scattered pattern east of Potlatch. None of those infested groups were particularly large or of great significance. FE activity, very widespread and damaging, as recently as last year, was greatly reduced.

On lands of all ownerships, FE-caused mortality totaled an estimated 18,000 trees on 19,100 acres in 2004. This year it has been reduced to only 300 trees on about 300 acres. DFB-killed DF, on the other hand, decreased only slightly, to 2,400 trees on 690 acres. WPB had killed almost 900 PP on about 500 acres. Other recorded beetle-related mortality was minor.

North Fork RD:

Very widely scattered, and mostly small groups of DF, killed by DFB, were mapped on the District. Noticeable concentrations were noted near Grassy Point. In the northeastern

portion of District (old Moose Creek RD) numerous, large groups MPB-killed LPP were observed; the largest were located near Clearwater Mine, south of Hoodoo Pass, and along Goose Ridge. Other significant groups were located in Kelly Creek drainage and its tributaries. Elsewhere, mostly small and very scattered bark beetle (DFB, WBBB, and FE)-caused mortality was found throughout the reporting area.

District-wide (including Pierce RD), bark beetle-caused mortality totaled: 1,200 DF killed by DFB on 790 acres (down from 1,300 acres in 2004); 22,000 LPP, 36 PP, and 115 WWP killed by MPB on a combined 9,900 acres (5,900 acres last year—the most significant increases were in LPP); 1,300 SAF killed by WBBB on 1,500 acres (3,600 acres in 2004); and about 600 GF killed by FE on only 520 acres (16,800 acres had been infested in 2004). BWA was recorded on another 10,100 acres (down from 15,300 acres) and blister rust was reported to have impacted WWP on almost 2,100 acres. Many of those affected trees may also have been infested by bark beetles.

Lochsa RD:

Numerous, but small and very much scattered groups of DFB-killed DF, and MPB-infested LPP were reported. A significant portion of the MPB-infested groups of LPP were mapped near Huckleberry Butte and Long Lake Point, south of the Lochsa River. A few widely scattered, small groups FE-affected GF were noted; but at a much reduced level than in the past couple of years.

In many high-elevation SAF stands, damage attributable to both BWA and WBBB was significant, and totaled more than 3,000 acres (18,000 acres in 2004) combined. Other District totals (including Powell RD) showed about 4,100 DF killed on 2,600 acres (virtually static levels from last year); 4,900 LPP, PP, WBP and WWP killed by MPB on a combined 2,100 acres (only slightly higher than recorded in 2004); 1,900 SAF killed by WBBB on 790 acres (2,400 acres in 2004); and 230 GF killed by FE on approximately 165 acres (down markedly from 9,200 acres last year). Another 2,200 acres were affected by BWA and 270 by blister rust—the former was a significant reduction from 2004.

Powell RD:

There were few major concentrations of bark beetle-caused mortality located anywhere on the District. However, numerous small groups of beetle-killed trees were reported throughout. MPB-killed LPP and DFB-infested DF were the most commonly encountered, but other a few groups of WBBB-affected SAF and FE-impacted GF were noted, as well. None of those infested groups were of major importance.

Bark beetle-caused mortality for portion of the Clearwater RA flown totaled 7,900 DF on 4,100 acres (4,350 acres in 2004); 2,000 GF on 1,030 acres (51,500 acres in 2004); 3,200 SAF on 2,300 acres (6,100 acres last year); and more than 27,200 MPB hosts killed on just over 12,100 combined acres (7,400 acres last year). For the reporting area, most beetle-affected—with the exception of MPB in LPP—areas declined in 2005.

Idaho Panhandle Reporting Area

Coeur d'Alene NF (Coeur d'Alene River RD):

Though declining somewhat in intensity, large groups MPB-killed LPP were still located west of Lookout Pass, and north of there to East Fork Eagle Creek. MPB-infested stands of LPP and WWP were very generally found throughout the eastern portion of the District.

Many smaller and widely scattered groups FE-infested GF were also found in southern and eastern portion of District, but much less than reported in the past two years. FE populations, generally, seemed to be returning to normal levels.

Small amounts of widely scattered DFB-affected DF were found in the south-central part of District, east of Graham Mountain. In the central portion of the District and west of there, especially near Boundary Peak, Stoney Point, Suburban Peak, Hamilton Mountain and Fraser Peak large infestations of WSBW were mapped in DF-dominated stand. Depending on weather over the next few years, those outbreaks could result in increasing DFB activity and resultant tree mortality.

On State and private lands surrounding Coeur d'Alene, small and widely scattered groups of their respective hosts were impacted by FE, WBP, DFB and MPB (in LPP). Populations of most bark beetles, however, were much reduced from the past few years.

District totals, on lands of all ownerships, showed DFB-infested area remained static in 2005. In 2004, just over 1,400 acres had been infested—1,410 acres were recorded this year. Less than 2,300 DF were killed. An estimated 300 SAF were killed by WBBB on about 250 acres—compared to 1,550 acres last year. Significant decreases in FE-killed GF were noted. In 2004, an estimated 27,100 trees were killed on 28,000 acres; those declined to 5,400 trees on 6,100 acres in 2004. MPB-killed WWP was noted on more acres, but fewer trees were killed. In 2004 an estimated 800 trees were killed on 450 acres; in 2005, 400 trees on 2,600 acres. Blister rust, however, was attributed with damaging WWP on about 11,000 acres. MPB-caused mortality in LPP increased markedly from 16,000 trees on 3,500 acres to more than 24,300 trees on 12,400 acres. WPB accounted for another 150 beetle-killed PP on about 90 acres.

Kaniksu NF (Sandpoint RD):

Small- to moderate-sized groups of FE-killed GF were still noted south and east of Sandpoint; but in much smaller groups and number of groups than in the past couple of years. Fader groups were still generally scattered from Prospect Peak north to Jakes Mountain, east of Lake Pend Oreille.

North and east of Sandpoint, FE-killed trees were much less frequently encountered, but a few small groups were mapped throughout mixed-conifer stands. Larger groups were mapped near Wylie Knob. Also to the north, along Hellroaring Ridge, a few groups of WBBB-killed SAF were observed.

District-wide, only 160 acres were still infested by DFB, compared to 600 acres in 2004. About 280 DF had been killed. FE killed an estimated 2,850 GF on about 3,100 acres. More than 9,400 acres had been infested last year. MPB killed 140 trees—nearly equal amounts of LPP and, with a lesser amount of WWP—on about 200 acres. WBBB-caused mortality totaled 400 trees on less than 600 acres. About 1,000 acres had been recorded in 2004. Other bark beetle activity was light.

Kanisksu NF (Bonners Ferry RD):

More of the District was flown in 2005 than in 2004, so much more beetle-caused mortality was recorded. That does not necessarily reflect a resurgence in beetle activity—most of which seemed to have generally declined. Small and declining groups of MPB-killed LPP were found near Katka Peak.

North of Highway 200 and east of Highway 95, to the Canada/US border, large groups of FE-killed GF, MPB-infested LPP, and WBBB-affected SAF were observed. Largest groups of FE-impacted stands were noted near Solomon Mountain, along Dawson Ridge, and south of Round Prairie. Larger groups WBBB-killed SAF were found near Bussard and Ruby Mountains. MPB activity in LPP stands was most noticeable near Hall, Bussard and Copper Mountains.

To the west, in the Selkirk Range north and west of Bonners Ferry, very large groups of WBBB-killed SAF, and MPB-caused mortality, in both LPP and WBP stands, was mapped from Bottleneck Peak and Snow Creek, north to the Canada/US border. Largest groups of MPB-caused damage, in both host species, were found in Trout Creek and Parker Creek drainages. Generally, LPP was infested on lower slopes and WBP was killed along ridges. MPB populations and BR infection levels have been very high in those stands for several years. Host depletion, especially in WBP stands has become more common. North of Long Canyon Creek, most MPB activity is confined to LPP stands. WBBB-caused mortality was heaviest in higher-elevation stands near Harrison Peak, Myrtle Peak, Smith Peak, Lake Mountain, Saddle Mountain, and Silver Mountain.

Throughout the District, MPB activity increased again in 2005, in LPP and PP stands, but declined somewhat in WBP and WWP stands. In 2004, more than 32,700 WBP; 28,000 LPP; and 250 WWP were killed in 2004, and mapped as faders in 2005. Those figures were 19,500 WBP; 47,700 LPP; 90 WWP; and 330 PP in 2005. Total acres affected by MPB, in all hosts, were more than 35,600 acres—compared to 36,500 acres last year; however, a portion of the District was not flown in 2004. WBBB killed more than 18,600 SAF on 20,200 acres—about the same amount recorded in 2004.

Kaniksu NF (Priest Lake RD):

West of Priest Lake, from the Canada/US border south to the District boundary, bark beetle-caused mortality was less significant than in the past few years. Widely scattered and small groups FE-killed GF and DFB-infested DF were found throughout mixed-conifer types. Heavier concentrations of FE activity were found from Outlet Bay north to Watson Mountain. High infection rates of BR in WWP stands near Gleason Mountain and Diamond Peak could also be accompanied by MPB activity.

WSBW activity to the north, from Granite Mountain to Kaniksu Mountain could also precipitate DFB-caused mortality. On that part of the District, WBBB-killed SAF was prevalent near Grassy Top, Mankato and Helmer Mountains.

On lands of mixed ownership, south of Priest River, numerous small groups of FE- and WPB-killed trees were found in stands of appropriate hosts. North of Priest River, a very few small groups FE-killed GF were recorded, as far north as Priest Lake. East of Priest Lake, small numbers of scattered groups trees impacted by FE, MPB (LPP) and DFB were noted. Largest group MPB-killed trees were located near Klootch Mountain; the most significant groups DFB-infested DF were found near Joe Peak. Widely scattered WBBB-affected SAF were found in a few high-elevation stands.

District totals for 2005 were: FE—1,050 dead GF on 1,670 acres; WBBB killed 1,800 SAF on 2,700 acres; 300 DFB-killed DF were observed on 255 acres; and MPB killed 55 trees on 75 acres—about equally distributed between LPP, PP, and WWP.

Totals for all three Districts in the Kaniksu RA showed 900 DF killed on 470 acres (down from 1,800 acres in 2004); FE killed 6,800 GF on 7,300 acres (only about a tenth the 65,800 acres recorded in 2004); MPB killed 68,400 trees (about one-third of which were WBP, most of the rest LPP) on 36,400 acres (down slightly from 38,000 acres in 2004); and WBBB killed 19,200 SAF on 19,200 acres—down a third from the 27,800 acres reported last year.

St. Joe NF (Avery/St. Maries/Red Ives RD):

MPB-killed LPP, though still quite prevalent throughout the reporting area is much reduced from the past few years. Larger groups, of 200-300 trees each, were mapped in southeastern portion of the area, near Neversweat Peak. A larger group, of 1000 trees, was observed near Sherlock Peak. From there, northwestward through the Bitterroot Range, groups were generally fewer and smaller than in the recent past. Fader groups were generally small and scattered throughout LPP type, with a few larger groups interspersed, all the way west to Big Creek. Numerous small groups, and a few larger ones, were found throughout St. Joe River drainage, as well; from Bacon Peak down to about Boulder Divide. On what was formerly the Red Ives RD, more than 13,200 acres of LPP still had significant amounts of MPB-caused mortality. Another 7,800 acres were reported on the old Avery RD. Other bark beetle-killed trees were much less frequently encountered. On fewer than 600 acres was DFB activity recorded.

Elsewhere, very small and widely scattered groups of DFB-killed DF and FE-infested GF were noted, but none were of significance. Notable groups of WBBB-affected SAF, were mapped in a few high-elevation stands, but totaled only about 600 acres. Both BWA and bark beetles may be influencing some of those stands.

On State and private lands, and Forest Service-administered lands north and east of St. Maries, a few large groups of MPB-infested LPP were observed near Kellogg Peak, Wardner Peak, and Mount Wiessner. Elsewhere in that vicinity, MPB in LPP, and FE and DFB were found to have affected their respective hosts in widely scattered and mostly small groups. Concentrations of DFB-killed DF were noted near Little Bald Mountain and Baby Grand Mountain, south of St. Maries; however, most groups were small. MPB was reported on just under 900 acres, and fewer than a tree per acre had been killed.

Throughout the IPNF RA, about 2,800 acres (3,800 acres in 2004) were still infested by DFB. In 2004, 50,600 acres were affected by MPB, in all of its hosts. That had increased somewhat, to 76,300 acres in 2005. Last year, 108,950 acres showed some level of FE-caused mortality; that declined remarkably in 2005, fewer than 15,000 acres. And the 30,500 acres infested by WBBB in 2004 decreased to 22,000 acres in 2005. With the exception of MPB, all bark beetle-related mortality declined in 2005.

Nez Perce Reporting Area

Salmon River RD:

The most often recorded fader groups continued to be GF killed by FE; and while intensity seemed to have declined, slightly more infested acres were recorded in 2005. Small groups were well-distributed throughout host types, but large groups were not as common as in the past couple of years. Largest of them were mapped both north and south of Bouffard Ridge, near Bear Gulch, and in the upper reaches of Slate Creek. West of the Salmon River, larger groups of faded GF were recorded near Indian Spring, Round Knob, and Center Ridge. Trees killed by DFB, WBBB, and MPB (LPP, PP, WBP) were much less significant, and found at not much higher than endemic levels.

Throughout the District, on a total of 12,300 acres, FE killed more than 21,000 GF. About 6,100 acres had been infested in 2004. WBBB killed 720 SAF on approximately 400 acres (620 had been reported last year); and MPB-killed hosts totaled 8,300 trees (mostly LPP) on about 5,800 acres. That was a considerable increase over the 350 acres reported last year. Minor amounts of other beetle-caused mortality were reported. With the exception of MPB in LPP, most bark beetle activity was static to slightly declining from levels reported in 2004.

Clearwater RD:

With the exception of a few small groups of IPS- and MPB-killed PP, the most dominant insect related problem continued to be FE-affected GF stands, though that activity has declined markedly from 2004 levels. Many small groups of faders, and numerous large ones, were still widely distributed throughout the reporting area. Largest of those groups, of several thousand acres each—although generally averaging one tree per acre or less—were recorded east and south of Grangeville. FE-caused mortality still totaled about a tree per acre on almost 13,400 acres.

A few groups of MPB-killed LPP were reported at some locations, one of 500 trees being noted near Hungry Ridge. Total MPB activity accounted for only 1,200 affected acres, however. BWA-impacted SAF, found scattered throughout the area and totaling about 2,100 acres, may also be infested by a few bark beetle species. On State and private land, east of Grangeville, a few small and widely scattered groups of WPB- and FE-killed trees were observed in relatively minor amounts. DFB activity was little observed.

Red River/Elk City RD:

Despite not all of the previously infested areas being surveyed in 2005, it appeared as though MPB-affected LPP stands have decreased significantly from levels of the past few years. Fader groups were large, but of mostly very light intensity—most averaging from one-quarter to 2 trees per acre. A few polygons, in the southern portion of the District were still mapped at 5- to 10-trees per acre, but those were the exception. Largest and most intensively infested groups were recorded from about Dixie, south. Throughout that area, occasional stands of SAF were infested by WBBB, those being especially noticeable around Homestake Mine. Total acreage affected by WBBB was about 15,500 acres—on which less than one tree per acre was killed.

Along the South Fork Clearwater River, several small groups of FE-infested GF were reported. Like MPB, FE populations, too, have declined. Only that portion of the District south of the South Fork Clearwater River was surveyed in 2005. The portion north of Elk City was still heavily infested by MPB/LPP in 2004—and quite likely is experiencing declining populations as is the rest of the District. Acres of LPP infested by MPB still totaled nearly 132,000 acres; but that was less than reported last year when 148,000 acres were infested.

Moose Creek RD:

Very generally scattered, but also very small groups of bark beetle-killed trees were observed throughout the reporting area. That recorded was predominantly MPB activity in LPP stands, but MPB was found affecting some PP stands as well. In DF or mixed-species stands, DFB-caused mortality was scattered at mid-range elevations; FE activity and WBBB-killed trees at lower and higher elevations, respectively.

Notable concentrations of MPB-killed LPP were mapped in North Fork Moose Creek and Wounded Doe Creek drainages, to the north. A larger group of the same was found to the south, near Gardiner Peak. Few of the infested groups of any of the beetle species

exceed 15 trees each. MPB activity accounted for about one dead LPP per acre on about 3,700 acres.

On the former Selway portion of the District, small and widely scattered groups of DFB-infested DF and FE-damaged GF were found in their respective forest types. Larger groups of GF, killed by FE, were noted east of Pine Knob; DFB-killed DF in Goddard Creek drainage, and MPB-infested LPP in upper O'Hara Creek drainage. Widespread BWA activity may have affected populations of some bark beetles.

For the entire Nez Perce RA, the most significant beetle-related mortality was attributed to MPB in LPP stands. More than 143,700 acres were infested (159,200 acres were mapped in 2004), and about 364,300 trees were killed—a significant decline from last year. MPB also killed 3,500 PP on 1,520 acres—about the same as recorded in 2004. Other bark beetle-caused mortality of significance: FE killed more than 67,800 GF on 34,000 acres (compared to 25,400 infested acres last year); WBBB killed 15,000 trees on 16,000 acres—a notable increase from the 5,100 acres recorded in 2004; and DFB-caused mortality totaled only 2,800 trees on 1,900 acres, a very slight increase. Of less importance: WPB killed about 100 PP on 100 acres. Fewer other bark beetles were reported in significant levels. and IPS killed 700 PP on 140 acres. Most infestation totals increased somewhat from 2004, but the most widespread—MPB—declined.

Indian Reservations

Coeur d'Alene IR:

Mostly small and widely scattered groups FE-killed GF and PP, infested by WPB were found throughout forested areas on the Reservation south and east of Plummer. None were larger than 100 trees each. All bark beetle activity and related damage is much reduced from 2004 levels.

Small groups of PP, killed by WPB and DF, killed by DFB, were noted at various locations, but were much less insignificant when compared to the amount of FE-caused mortality distributed throughout the area. FE-killed GF totaled only 1,100 trees on less than 500 acres. A few groups of WPB-killed PP were concentrated just south of Lovell Valley. A total of 1,000 PP were killed by WPB on about 600 acres—a slight reduction from the 900 acres reported in 2004. Lesser amounts of DFB- and IPS-caused mortality were observed.

Nez Perce IR:

Large groups of MPB-infested LPP and FE-killed GF were once again found southeast of Lewiston in the Waha Mountains. Largest groups MPB-caused mortality were noted east of Black Pine Campground; while larger groups FE-affected stands were located north

there and west of Winchester. East towards Cottonwood, small and widely scattered groups of WPB- and FE-killed trees were observed.

Other smaller groups of FE-killed trees were found throughout host type on the Reservation, but very much reduced from 2004 levels. Last year, more than 26,000 GF were killed on 75,140 acres, on the Reservation. Those figures declined markedly to 3,900 trees on fewer than 6,800 acres in 2005.

At various sites in the reporting area, numerous but small groups of PP were killed by WPB—totaling 450 trees on 155 acres. In addition, a large group of MPB-killed LPP was mapped southwest of Soldiers Meadow Reservoir in 2004 declined in 2005. About 1,400 LPP were killed on 1,600 acres (down from 3,400 acres last year). Throughout the Reservation, IPS activity accounted for 50 dead PP on about 40 acres. DFB killed 160 DF on close to 115 acres. Both those latter estimates were about the same as recorded in 2003.

BARK BEETLE-RELATED SPECIAL PROJECTS--IDAHO

An Operational Case Study: Using Verbenone to Protect High-Value LPP Leave Strips at Lookout Pass Ski and Recreational Area, Idaho- 2003, 2004, 2005

Applications of verbenone, anti-aggregation pheromone for MPB, began on the ski hill in 2003, when 40 acres of leave strips were treated. Treatment area was expanded in 2004 to cover 100 acres. In 2005, 120 acres of susceptible forested strips between ski runs in the ski/recreation area were treated.

Based on experience of other FHP specialists in Region 1 and 4 (Gibson, Munson, and Progar, Personal Communication, 2003), we applied 20, 5-gram verbenone pouches per acre on a 15 meter grid (~45') to the treatment areas in early spring (5/31 and 6/1/2005). We re-applied an additional 20, 5-gram verbenone pouches per acre to the treatment areas in July, 2005.

Treated areas were by and large protected. Some attacks were noted, particularly along edges of treated and untreated polygons. Current MPB attacks were found during surveys conduced in untreated polygons in the fall of 2005. Plans are underway to treat 140 acres of forested leave strips in the ski/recreation area in 2006. A more detailed report is forthcoming.

For additional information, contact Carol Randall, CFO.

Aerially Applied Verbenone Flakes for MPB Control in LPP, Red Ives RD:

A landscape-scale test for verbenone flake efficacy against MPB attack was conducted in LPP stands east of Red Ives RD, IPNF. Objectives were to: test efficacy of the verbenone flake formulation in interrupting the response of MPB to standard lures, test its efficacy in protecting host trees in treated stands from MPB attack, and assess its non-target effects. Disrupt® verbenone flakes (Hercon Environmental) were applied at 150g AI/acre by helicopter to five, 50 acre treatment plots. Five, 50 acre untreated plots were established as controls. Baited traps were placed in each of the treated and untreated plots, and efficacy will be assessed by measuring beetles/trap, tree attack rate, and tree mortality by visually evaluating all susceptible hosts within and along 4 transects per 50 acre plots.

Data from this study are in the process of being analyzed and should be available soon in a preliminary results report.

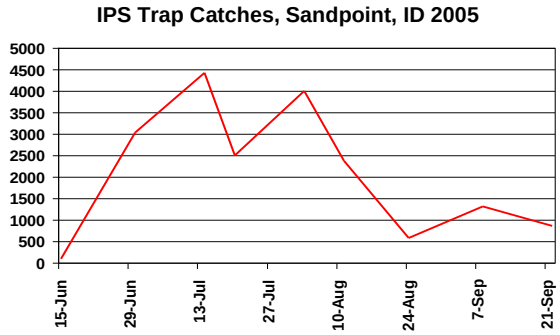
For additional information, contact Lee Pederson, CFO.

IPS Trapping on IPNF

For the past few years, fire crews have been thinning low elevation PP and LPP plantations in early spring on scattered Forest Service (FS) lands southwest of Sandpoint, ID. Being aware risk of IPS buildup in spring-created slash, district personnel have thinned into early summer, creating a "green chain" to prevent attacks in leave trees. In April 2005, thinning was completed in a 110-acre stand near Clagstone, which was surrounded by private land. Slash examined in late-May was found to be infested by IPS.

Neither burning nor removing slash was an option, so 30 pheromone-baited funnel traps were placed throughout the area on June 1. Thirteen were placed near slash piles close to private land; the remaining seventeen along a dirt road through the plantation's center. Traps were emptied about every two weeks. Pheromones were replaced August 3 and traps removed September 22.

More than 19,000 IPS were trapped. Peak flight occurred July 14, with a smaller "peak" on Aug. 3. Subsequent surveys in the plantation and surrounding private land revealed no IPS-killed trees. Monitoring of the area will continue into 2006 in the event trees attacked during this past summer do not fade until next year.



For additional information, contact Sandy Kegley, CFO.